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A Fresh Look at an Old Artifact: A New Interpretation of Edged Cobbles at Cherry Point (45WH1), Northwest Washington

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at Cherry Point (45WH1), Northwest Washington

By

Jamie Palmer

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MASTER'S THESIS

Jamie Palmer

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A New Interpretation of Edged Cobbles
at Cherry Point (45WH1), Northwest Washington

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Abstract

As scientists, archaeologists sometimes accept interpretations proposed long ago as the standard. For this thesis, I chose to challenge the consensus hypothesis that edged cobbles (aka cobble choppers) were primarily used for wood-working activities in the Salish Sea during the Locarno Beach phase (3200-2400 BP). I questioned this hypothesis for two reasons: first, because previous analyses failed to use replication as an aid in recognizing relevant use-wear attributes; and secondly, because alternative uses for edged cobble during the Locarno Beach phase were never tested. My research tests the hypothesis that edged cobbles were used in the manufacture of stone weights for fishing activities at the Cherry Point site (45WH1) in northwest Washington. Using replicative experimentation, morphological, temporal, and spatial analyses, I analyzed the Cherry Point edged cobble assemblage and demonstrated that the occupants of Cherry Point not only used edged cobbles for wood-working but to also modify stone. Statistical analyses further supports this conclusion and indicates a strong association between edged cobbles and stone weights at Cherry Point. My research highlights the individual decisions and choices involved in the organization, maintenance, and use of edged cobbles at Cherry Point. It also demonstrates the value of information which can be gleaned from a humble tool and shows how taking a fresh look at an old artifact can allow archaeologists to discover new insights into the lives of prehistoric peoples in the Pacific Northwest.

Acknowledgements

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I would like to thank the WWU anthropology department for always finding time to help with paperwork and other processes I had no clue about. I know how busy you are and I appreciate that you took time to walk me through things. I owe many thanks to the anthropology grad cohort who was always willing to listen and give suggestions when I was stuck about how to proceed. And to all of the archaeology students who were in the lab at all hours of the day; it would have been a lonely and quiet lab without you there. And thanks to Erik for his help with collecting cobbles in the field and doing the tedious work of measuring and weighing each and every one of them. Without all of this help and support my research would have not been possible.

Finally, and most importantly, I would like to thank my wife Alison and my daughter Abigail. You two are the joy of my life, the light of my heart. Your support, encouragement, patience and unwavering love were the rock that allowed me to endure and survive the experience of graduate school. Love m'ladies!

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CHAPTER 1: INTRODUCTION

An edged cobble (commonly known as a cobble chopper) is a water-rounded cobble with a unifacial edge created by hard-hammer percussion (Figure 1) (Borden 1968a; Haley 1987; Roulette 1985; Stewart 1973).

Figure 1: Plan view of a replicated edged quartzite cobble.

It is a non-hafted tool and its weight makes it well-suited for heavy duty chopping tasks such as felling trees or disarticulating animal carcasses. Edged cobbles appear in the archaeological record in a variety of forms that are repeated throughout time and at sites across the world. For example, Gamble (1999) notes that edged cobbles are found in archaeological sites dating back to 1.9 mya (Olduvai Gorge, Tanzania) and Hayden's (1979) observations of the Australian Aboriginals of the Western Desert use of edged cobbles to disarticulate carcasses. In the Pacific Northwest, ethnographers observed and archaeologists hypothesized that edged cobbles were used in different activities: disarticulating carcasses (Hayden 1979), as throwing stones (Steward

1928), skinning animals (Cressman 1960; Nelson 1969), shredding dried salmon (Strong 1930), smashing bones for marrow extraction (MacDonald 1969), wood procurement/wood working (MacDonald 1969; Roulette 1989), net weight production (Roulette 1989), and overall heavy duty chopping work (Borden 1968b; Suttles 1968). Stewart's (1973:66) drawing (Figure 2) illustrates common interpretations of edged cobble use in the Pacific Northwest.

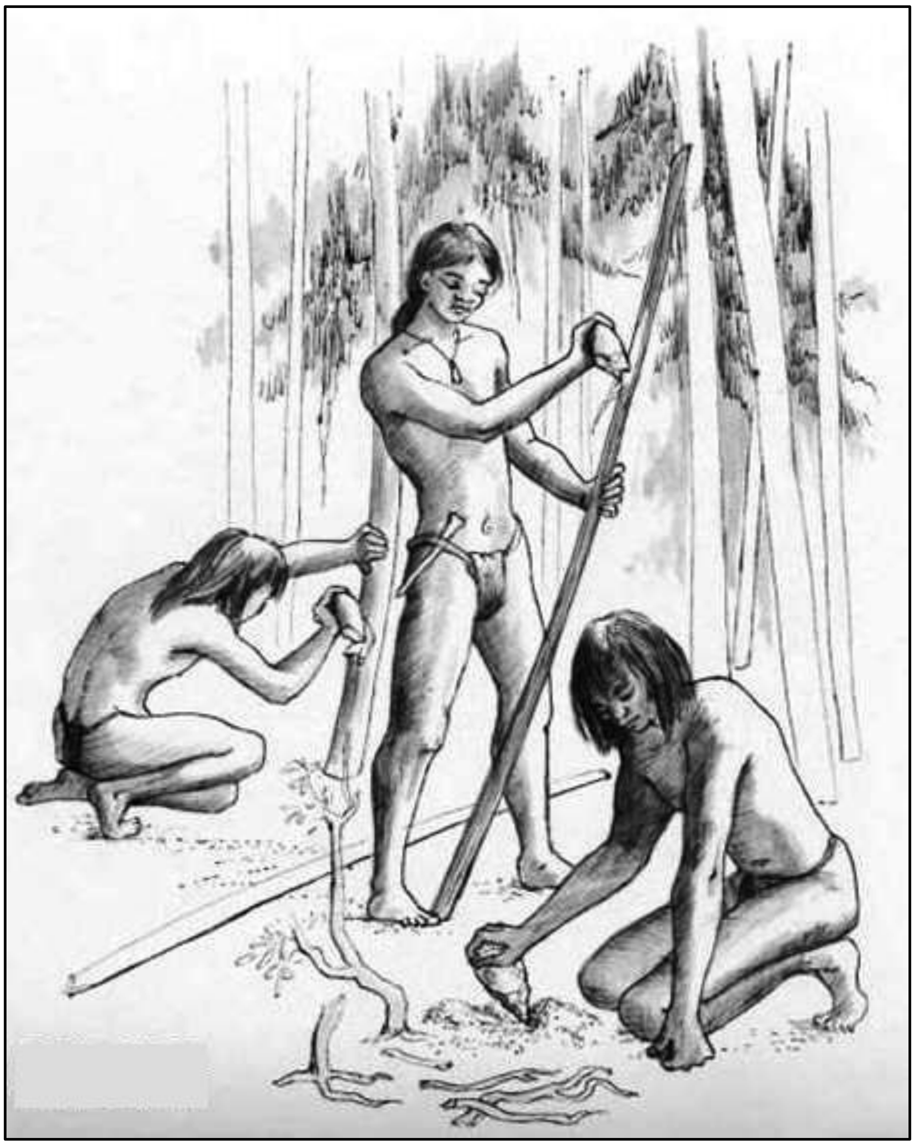

Figure 2: Stewart (1973:66) depictions of edged cobbles in use for chopping and scraping wood, as well as digging.

Archaeological research on edged cobbles in the Salish Sea began with a culture historical focus. In Borden's 1968 South Yale site excavation report, he suggested that edged cobbles were a temporal marker representing the Pasika Complex which he assigned the date range of 12,000-9,000 BP. This hypothesis was proven false as more sites in this region were excavated and better dates were obtained. Once the culture historical paradigm was rejected, Northwest Coast archaeologists looked to create a universal typology or determine function by looking at chopper morphology, worked edge location, worked edge angle, use-wear and reduction strategy (e.g. Ames and Maschner 1999; Gaston 1975; Grabert 1979). From this research, a general consensus arose that edged cobbles were the main wood-working tool during Pacific Northwest prehistory until they start to replace by adze blades 2,500 years ago.

Other archaeologists hypothesized that these tools were also used to modify stone. For example, Hayden and Nelson (1981) suggested that chopper-like tools were used to manufacture the stone bowls found on the Northwest Coast. Schwartz and Grabert (1973) noted that extensively used edged cobbles occurred with large girdled and perforated stone weights in an early cultural component at Cherry Point. Roulette (1989) also noted this and hypothesized that edged cobbles not only used on wood, but were also used for another task: stone net weight production. His hypothesis is based on the observation of a high quantity of edged cobbles recovered in close proximity to stone net weights in various stages of production in the archaeological record at Cherry Point (45WH1), a multicomponent site in the Salish Sea (Figure 3). Neither of these aforementioned hypotheses concerning alternative use of edged cobbles in the Salish Sea has been tested.

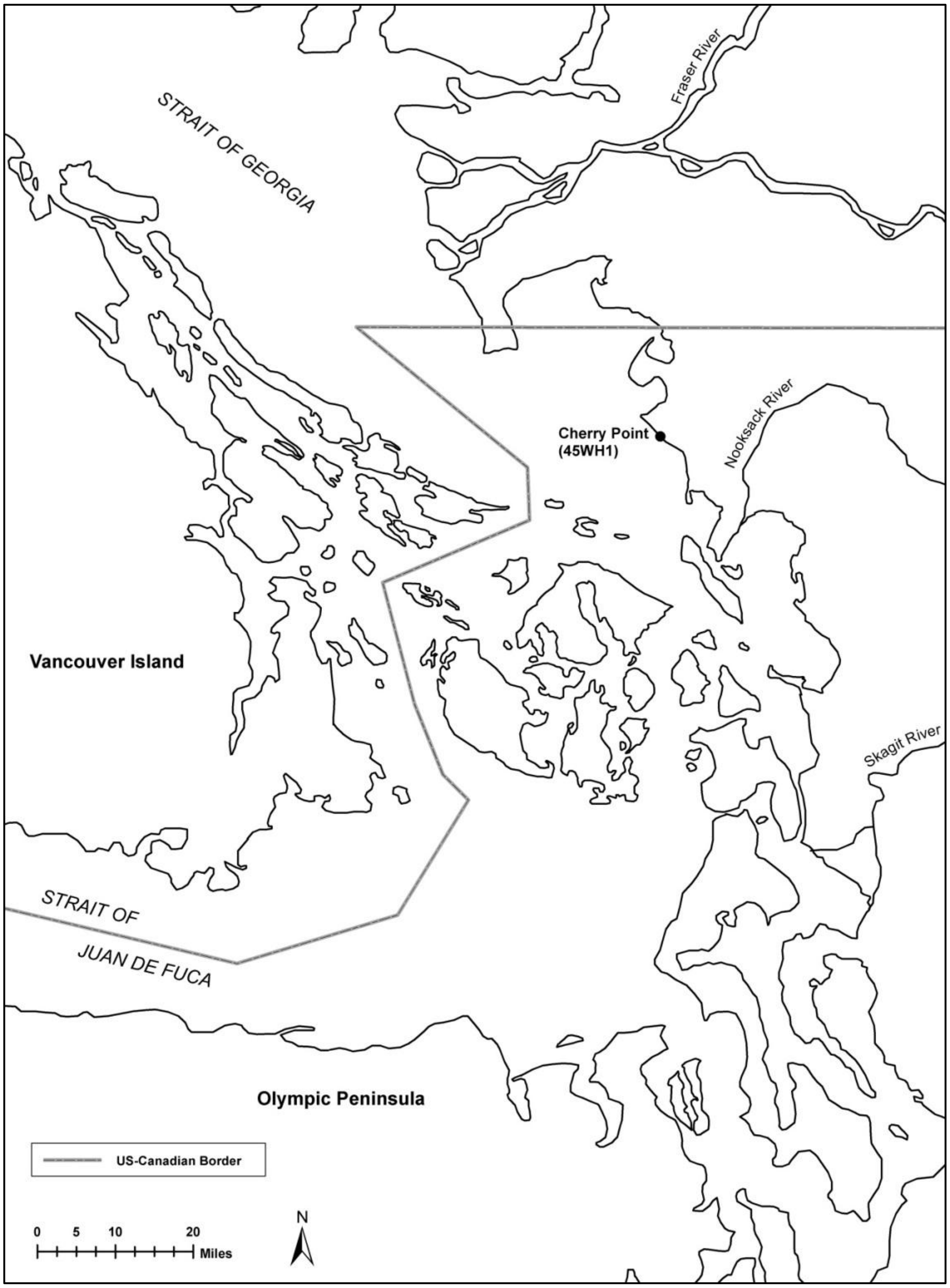

Figure 3: Location of Cherry Point (45WH1).

This thesis tests Roulette's proposed interpretation of the how the edged cobble at Cherry Point may have been used. Cherry Point is an excellent site for studying alternative uses of edged cobbles because of the large sample (over 300) recovered from archaeological contexts dating to the Locarno Beach and Marpole cultural phases. In addition, over 200 perforated or girdled stone net weights in various stages of production were recovered which allows testing spatial association.

Cherry Point (45WH1)

Cherry Point (45WH1) is late prehistoric shell midden overlooking the Strait of Georgia in northwestern Washington. Radiocarbon dates and artifacts indicate the site from around 3300 BP and into the Historic Era. The artifact assemblage also indicates a variety of subsistence activities centered on the acquisition and processing of marine resources. Included this assemblage are nearly 200 stone weights commonly seen with different types of fishing gear. As noted by earlier researchers, a high number of edged cobbles are found in proximity to these stone weights.

Historically, Cherry Point was a known reef-netting and herring roe collection locale. Suttles (1951:33) notes that Cherry Point was traditionally used by Straits Salish families, whose descendants reside at the Lummi Indian Nation and elsewhere. These families maintained specialized knowledge of reef net locations, shared the technological knowledge and materials available at Cherry Point for making reef net anchors and weights with affinal relatives and the weights and anchors would often be transported to other reef net locations (personal communication Al Scott Johnnie 2011).

Ancient uses of the site were undoubtedly responsive to the unique resources available at this location, not only rich animal resources but the cobble beach itself. The site is located on a southwest facing wave-cut bank fronted by a cobble beach (Figure 4) that was deposited during the Fraser Glaciation approximately 25,000 to 15,000 (Easterbrook 1963; Weaver 2013). Grabert (1988:8) states that the beach at Cherry Point "is composed mainly of cobble sized material, grading to gravel and sand to the southeast." Cobble beaches such as this are rare on regional shorelines.

Figure 4: The cobble beach adjacent to Cherry Point, looking southwest. Photo taken by author on November 3, 2010.

The high biodiversity of the aquatic environment at Cherry Point has been recognized by the designation of the Cherry Point Aquatic Reserve. Diverse habitats from the littoral zone to the kelp and eel grass beds support a complex food web based partly on the large populations of forage fish including surf smelt (*Hypomesus pretiosus*), northern anchovy (*Engraulis mordax*), and the largest Pacific herring (*Clupea pallasii*) spawning stock in Washington. Spawning aggregations of these fish occur from spring to early fall, providing an important food source for seabirds and a variety of fish, including salmon. Eight species of salmon and trout historically occurred nearshore at Cherry Point. Sockeye (*O. nerka*) were particularly numerous on their migratory path to the Fraser River. (Washington State Department of Natural Resources 2010:22).

History of Excavations at Cherry Point

Garland Grabert, anthropology professor at Western Washington University, excavated Cherry Point during eight archaeological field schools between the years 1954-1986. Except for the trenching done by Taylor in the early 1950s and testing during the 1986 field school, the majority of the site was excavated in the following manner. Grabert used a 3-meter x 3-meter grid system to lay out the excavation squares. Within each excavation square, a 2-meter x 2-meter area, noted as a “cut”, was defined in the center of the excavation square (Figure 5).

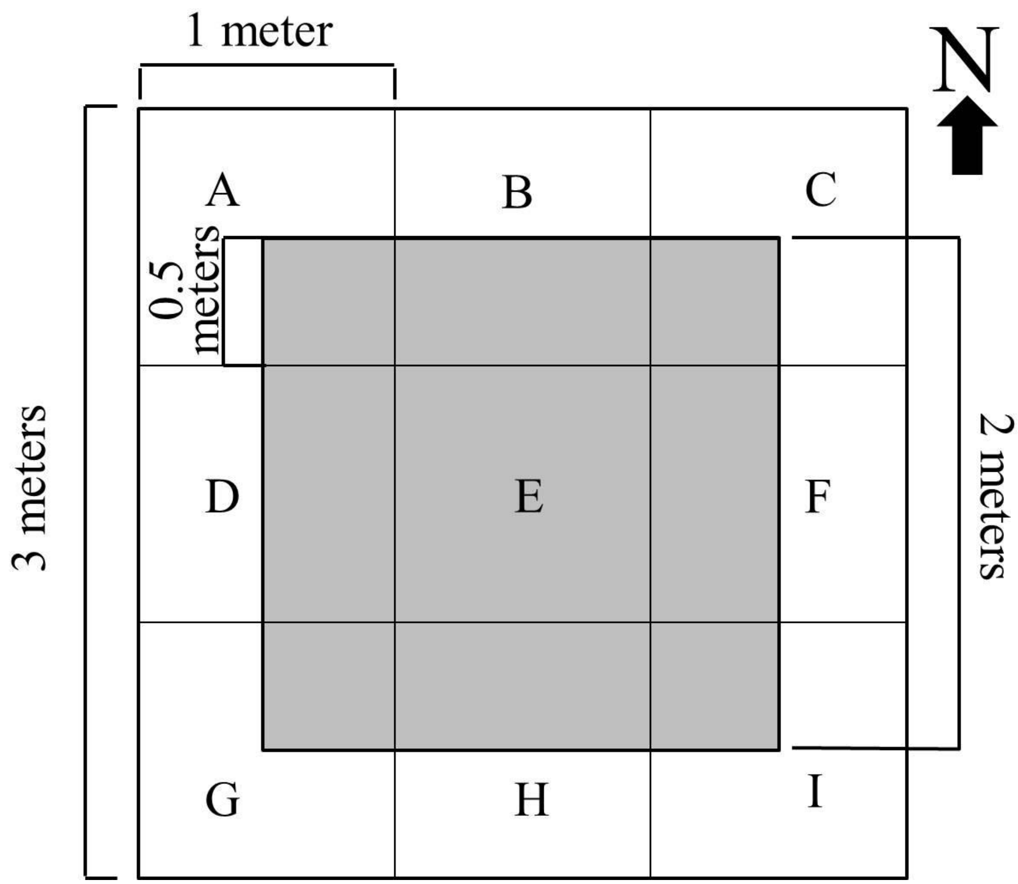

Figure 5: Layout of Cherry Point 2x 2 m excavation “cut” (shown in gray), within the 3 x 3 m square, and further division of the 3 x 3 m cut into 9 1 x 1 m units.

Within each excavation square, the internal horizontal control was provided by nine 1-meter x 1-meter “units”. These units were labeled with the letter “A-I”. Overall, the eight field schools excavated 72 excavation cuts (Figure 6).

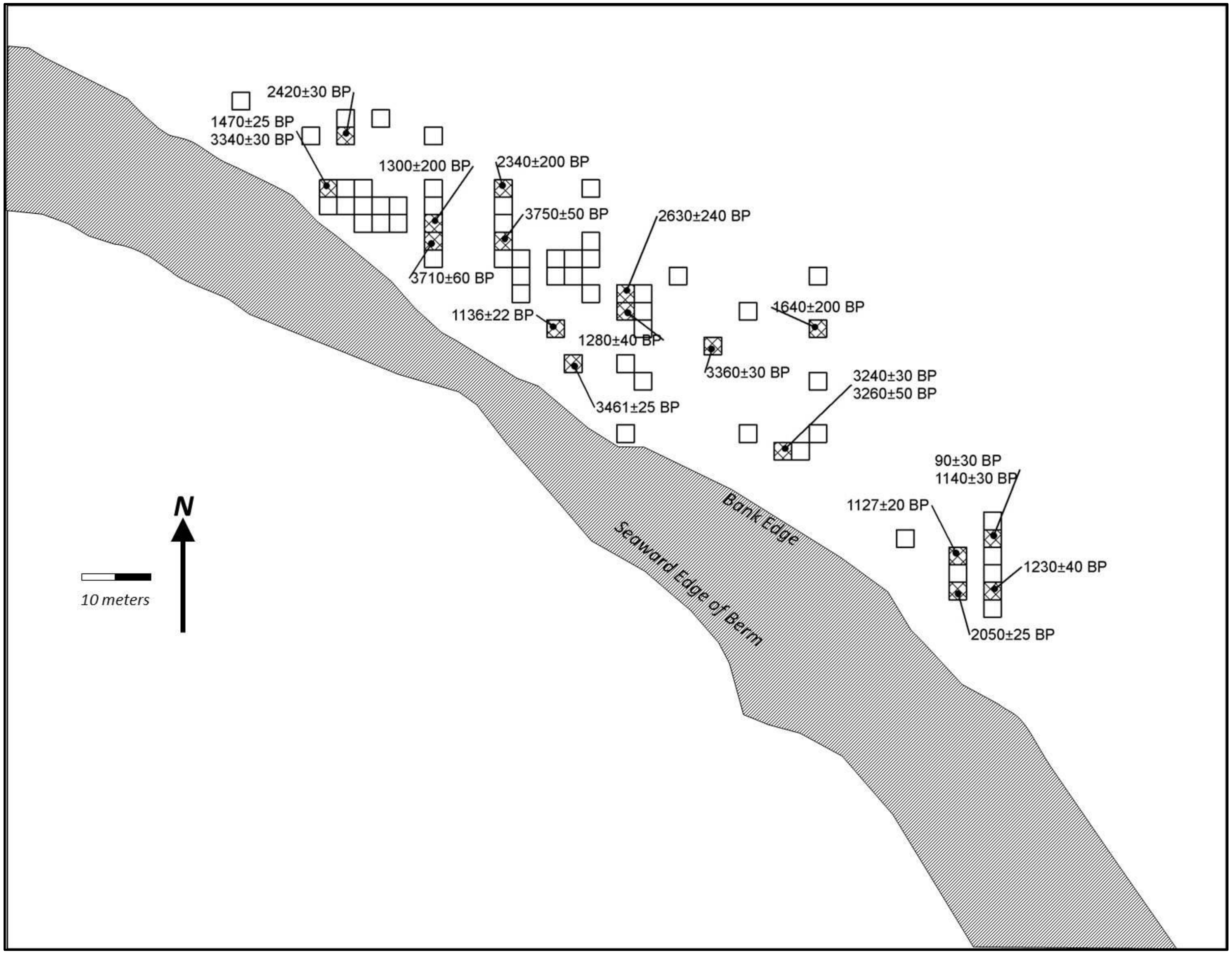

Figure 6: Location of Cherry Point excavation cuts with associated radiocarbon dates.

Grabert (1988:21) stated that the bulk of the excavation occurred in arbitrary 10 centimeter or 20 centimeter levels, but in some instances the natural strata were followed. Frequently, features were pedestaled to indicate depth. The majority of the matrix was screened through ¼” mesh wire screen and small samples were examined in 1 millimeter screens (Grabert 1988:21).

During the eight archaeological field schools, over 4100 artifacts such as adzes blades, cobble tools, bone harpoon points, pendants and historical artifacts were collected. Grabert (1988:106) hypothesized that while the evidence is sparse Cherry Point “may represent efforts of some small community or a segment to establish the place as a winter settlement.” His hypothesis is based on the location and south-to-southwestern exposure of the site as this orientation, along with a forested shoreline, “would have provided a somewhat ameliorated local temperature during the winter” (1988:7). Currently, the Cherry Point artifacts are housed in the archaeological repository at Western Washington University.

Numerous theses have resulted from data generated from the Cherry Point assemblage. Blodgett (1976) analyzed and interpreted features and artifacts recorded and collected from the 1975 field season and Markham (1993) studied the historical assemblage associated with the historic fish trap complex. Other theses have analyzed aspects of technology including bipolar flaking (Desilets 1995); slate tool manufacture (Donald 1995); elk and deer metapodial strategies (Dugas 1996); Dubeau (2012) analyzed faunal remains. Several multi-site analyses included materials from Cherry Point: marine mammals (Stone 1998) barbed bone points; (Rorabaugh 2010); isotope analysis of waipit bone (Tierney 2012); dacite sourcing (Osiensky 2014); personal ornamentation (A. Palmer in progress). In another publication, Hanson (1994) analyzed the faunal material from the 1976 field season. The variety and breadth of research using data generated from the Cherry Point collection illustrates the complexity of this site. I extended the research of the Cherry Point lithic assemblage by testing if edged cobbles were used on stone through experimental archaeology in order to gain an understanding of the behavior of the prehistoric occupants of Cherry Point.

Thesis Organization

The remainder of this thesis is divided into five chapters. In Chapter 2, I discuss the previous research concerning edged cobbles in the Pacific Northwest concentrating on efforts that focused on morphology, use-wear, and maintenance. I also introduce design theory, the behaviorally oriented approach, which guided my research strategy. I end the chapter with a summary of my hypotheses. In Chapter 3, I outline the framework for my research methods starting with my experimental archaeology component. My goal for this chapter was to recognize attributes that I could use to make cultural inferences regarding the decision-making processes with which the Cherry Point occupants manufactured, used, broke, resharpened, and discarded the tools.

In Chapter 4, I discuss the results of my analysis of the Cherry Point edged cobble assemblage focusing on tool morphology, material type, edge damage type, resharpening, and relationships between these variables. In addition, I look at the spatial association of edged cobbles with stone weights, and how these vary temporally. In Chapters 5, I discuss my results, summarize my work, and identify possible future research avenues.

CHAPTER 2: PREVIOUS RESEARCH ON EDGED COBBLES IN THE PACIFIC NORTHWEST

Edged cobbles appear in the archaeological record in a variety of forms that are repeated at sites across the world, but in the Pacific Northwest they are found with such consistency and high frequency that I will only focus on previous research in this region. Looking back at the history of research on edged cobbles, a pattern emerges. Initially, culture historical approaches were used, followed by traditional processualist lines, and currently a more behavioral post-processualist lens is being used in hopes that this avenue will provide insight into the behaviors of the prehistoric peoples of the Northwest Coast.

Early research focused on the temporal significance of this tool and the creation of a static descriptive typology that noted variations. Subsequent research focused on investigating the variations through a function-based lens. For example, Valley (1979), Haley (1987), and Rahemtulla (2006) successfully explained the variations of choppers found in the archaeological record by demonstrating that edged cobbles are imbedded in a dynamic framework and the stages in the life cycle are due to completing a task. This revelation shifted the focus away from the role of edged cobbles to the conscious decisions made by their users.

Edged Cobble Morphology as Key to Function

The culture historical approach to edged cobbles saw them as an early, somewhat crude technology, and analysis focused on the explaining the diversification of shapes found in the archaeological record. Borden (1968b) was the first archaeologist to show this tool possessed information about prehistoric life ways. In his excavation report of the South Yale site, in southwestern British Columbia, he used the South Yale unifacial cobble industry to define the Pasika complex to which he assigned the date range of 12,000-9000 BP. He argued that the Pasika complex was earlier than any other Northwest Coast cultural phase, citing the depositional context of the artifacts and the high count of unifacial tools which he believed required little training or skill to produce. He noted that in the lower deposits these tools were not associated with any bifacial tools and argued that they dated from a time before bifacial flaking was widespread in the Americas. However later research placed unifacial cobble industries of the Pasika Complex into a 6,000 to 3,000 years B.P time frame (Haley (1987).

In his report, Borden (1968b) created a twenty category typology based on the different morphologies he noted at the South Yale site. The typology is focused on the differences between edge shape, edge location, number of scars, retouch, edge angle, and cobble shape. By focusing on these six attributes, Borden intended to decipher the specialized function the edged cobble was intended to perform. I find that in Borden's twenty category typology, there is some overlap in the morphology and the distinction is based more on the flaking of the worked edge instead of the overall shape of the edged cobble. Other archaeologists (Haley 1987, Valley 1979) decided that all of the different edged cobble "types" actually represented one tool type and the variations are a result of fulfilling a need in a specific context or reflect degree of use. Haley (1987) examined cobble choppers from South Yale and Union Bar sites; both of these sites have an occupation range of mid-Holocene to late Holocene.

Haley (1987) chose not to use Borden's typology because he felt that the data were presented in such a way that no comparisons could be made. Instead he focused on determining if the variation in chopper morphology was based on function. To do this, he developed a Manufacture/Use/Maintenance system model (1987). To test this model, Haley selected an unspecified number of water-worn cobbles (of a certain size, shape, and material), created edged cobbles from these cobbles, resharpened the edged cobbles, and finally discarded the edged cobbles. Haley (1987:122) concluded that edged cobbles exist on "a continuum of ever changing forms with sets of shared characteristics reflecting the tools' positions within a coherent manufacture/use/maintenance system."

Valley (1979) attempted to apply a morphological classification scheme to the peripherally flaked cobble assemblage from the Kersting Site (45CL21) in the lower Columbia region of southwestern Washington. Several radiocarbon dates and stylistic assemblage comparisons place site occupation between (approximately 2500 BP to 0 BP). Valley examined 3316 peripherally flaked cobbles composed of igneous and metamorphic rock. At this site, over 50% of the peripherally flaked cobbles are composed of quartzite. Valley wanted to determine if there was an interrelationship between the qualitative and quantitative characteristics. He statistically analyzed the frequency distribution, means, minimum/maximum values, standard deviations, correlations and Chi Square tests for length, width, thickness, weight, and extent of peripherally flaking in order to define chopper categories. He interpreted the results to show that despite the variation in chopper shapes, they represent a single tool type.

Eventually, archaeologists abandoned the creation of a morphological typology of cobble choppers, rejecting it for a more complex strategy for discerning chopper functions which involved focusing on reduction and curation strategies (Rahemtulla 2006 and Storey 2008). This is a shift from a processualist approach with the analysis of lithic tools to a post-processualist approach that places more emphasis on individual decision making. For example, Rahemtulla (2006) aimed to understand the decisions made by prehistoric toolmakers at Namu when they were designing their lithic technological system and the empirical effects of these decisions. This conclusion does not deviate from earlier hypotheses about the purposes for which edged cobble uses, but it is interesting that he remarks that edged cobbles are created to fulfill a need in a specific context using the available materials and not from a closely followed template. This would explain the variations in a single tool type as noted by Valley (1979). Since devising a morphological typology to differentiate functions of edged cobbles was found to be an unproductive pursuit, archaeologists focused their attention to characteristics of the worked edge to understand how they were used.

Analysis of Worked and Worn Edges

The worked edge of an edged cobble is the only part that is modified by people, first by creation of the edge, then through use on an object. The attributes of the worked edge are an important factor in understanding which specific material an edged cobble was used on which theoretically would help understand behavior. Two commonly studied attributes of the worked edged are use-wear and edge angle. Previous researchers have noted edge damage in forms of edge rounding, polish, battering or a combination of these qualities. Grabert (1979:173) created an edged cobble by flaking the longitudinal side of a 10 cm long quartzite pebble. He then used this replicated edged cobble to pound Swiss steak over a number of years. Grabert noted the edge damage was very faint and comparable to an undamaged edged cobble in archaeological assemblages. He also noted that after a number of years, the faint edge damage was virtually unnoticeable. Haley (1987) conducted an experiment in the replication and maintenance of edged cobbles, but did not focus on edge damage. He only noted that as an edged cobble was used, the worked edge become dull. Flenniken (1977) created an experiment where an edged cobble was used to extract marrow. He placed the bone on a stone anvil and split the bone longitudinally with an edged cobble. He noted that at times, the edged cobble would come in contact with the stone anvil. The result of this interaction was pock marking along the worked edged. He also noted that extended use of the edged cobble in this manner resulted in the entire worked edge being obliterated with pock marks.

As part of her analysis of the entire lithic assemblage from Crescent Beach site, approximately 30 kilometers northwest of Cherry Point in British Columbia, Pratt (2008) stated the use-wear on some choppers is consistent with heavy duty chopping activities, but the actual functions are difficult to discern due to the coarse grained raw materials. Pratt did not explain the method she used to observe edge damage; however, she raises the issue of the coarseness of the grain making it difficult to determine the type of materials the tool was used on. Storey (2008) gives excellent definitions of what types of use-wear are expected, but she does not list what types of characteristics are commonly associated with each material type. In connection with her analysis of artifacts from the Richardson Island site, Haida Gwaii, British Columbia, Storey states that expected functions of choppers are butchering, felling trees and woodworking but does not believe the actual functions can be determined through use-wear analysis with present methods. She also raises the issue that tools that are too weathered or water-worn generally have indeterminate use-wear.

Another attribute of the worked edge that could help determine what material an edged cobble was used on is edge angle. Rahemtulla (2006) states that in the brief analysis of the chopper assemblage at Namu the average edge angle is 80°. He also states that an average edge angle in the low 80°s suggests a degree of standardization was applied during the manufacture of this tool. In a similar analysis, Storey (2008) measured the morphological attributes of the edged cobbles from the Richardson Island site. Her interpretation of the edged cobble assemblage did not vary from the standard interpretation that these tools were best suited for heavy duty chopping tasks on bone or wood.

Maintenance

Haley (1987) argued that the morphological variation was due not to functions inferred from differences in edge traits, but to the tool being in different stages of reduction, use, and maintenance. He states the previous edged cobble typologies are no more than descriptions of the physical characteristics and this type of classification system did not address the behavior of the site occupants. In trying to understand the reduction strategy used, he created a model focused on understanding the reduction strategy. Haley's (1987, 1996) edged cobble reduction model has six steps in which the different variations of a edged cobble may be represented: 1) initial selection and treatment of cobbles, in which the cobble is selected based on size, shape and raw material, 2) edged cobble edge creation/initial sharpening, in which the worked edge is created upon the preferred margin, 3) successive resharpening, in which the worked edge is resharpened or reshaped after use, 4) worked edge rejuvenation, in which the entire worked edge is removed in one large flake once it becomes too battered or thick to resharpen, 5) "exhausted chopper" production, in which an edged cobble is resharpened to a point where edge rejuvenation and edge retouch is no longer possible and 6) flake/spall tool production, in which the flake or spalls created by steps two-four are used for a variety of tasks. This model is ground-breaking in the sense that Haley has taken a decidedly different approach to edged cobble analysis because of the failed attempts of other approaches. The fluidness of this model allows for a "highly flexible output system that defies typology" (Haley 1987:353). This model is appropriate because cobble choppers are imbedded in a dynamic framework and may help explain the behaviors or intentions of the site occupants.

In his dissertation, Haley applied this model to the edged cobble assemblage from the Union Bar and the South Yale site. His model accounted for both sites' entire edged cobble assemblages, with each edged cobble falling into a section of his lithic reduction model. However, he only provides counts for the total number of edged cobbles and exhausted edged cobbles, not counts for each phase of his model. At the South Yale site, edged cobbles ranged in length from 7 cm to 20 cm and had edge angles that ranged from 45° to 85°. Unfortunately, Haley (1987) does not list any metric measurements for the edged cobbles at Union Bar. Using his lithic reduction model, Haley also reached the same conclusion as Valley (1979) in that edged cobbles represent a single tool type and the differences in shape can be attributed to different stages of manufacture, use, and rejuvenation. In his dissertation research, Rahemtulla (2006) analyzed the chipped stone tool component of the Namu site which is located on the central coast of British Columbia. He examined thirteen edged cobbles that had average metric measurements of 9.2 cm (length) x 7.9 cm (width) x 4.6 cm (thickness) x 479.1 g (weight) and edge angle of 80° (2006:210). Rahemtulla (2006) does state that due to an edged cobble's form, it is a logical assumption that they are being designed for woodworking activities and the average edge angle of 80° suggests a measure of standardization for this tool (2006). Finally, he notes the edged cobble variations "conform to Haley's (1987) reduction sequences for pebble tools from sites further to the south" (2006:211).

Humble Tool, Complicated Decisions

Despite the attempts of a few archaeologists to change how edged cobbles are interpreted, the current practice is to state the standard interpretation that edged cobbles were used for heavy duty chopping tasks. In spite of several decades of changing approaches to the analysis of edged cobbles, our interpretation of their function as tools used for wood-working, digging, or disarticulating animal carcasses has become the default explanation. This is particularly apparent in terms of the interpretation of their role in the Locarno Beach cultural phase; they are still considered to be the primary wood-working tool at this time, to be replaced by adze blades in the Marpole cultural phase. My goal is to challenge this assumption by looking at edged cobbles with a design theory approach and replication.

At Cherry Point, the design decisions of the prehistoric makers and users of edged cobbles can help archaeologists better understand the overall activities at the site. These activities include not only the selecting of unmodified cobbles and manufacturing process of artifacts such as net weights, but potentially the duration and stability of occupation (year-round, repeated seasonal, or single episode), and site organization. It can also tell archaeologists whether or not an edged cobble went through episodes of resharpening. The state of the edged cobble at discard could shed light on whether this particular artifact met the expected performance of the group's requirements.

Using design theory, I examine the adaptive design of edged cobbles to understand the behaviors of the Cherry Point occupants during the Locarno Beach and Marpole cultural phases. I anticipate that social factors influence how edged cobbles were used during these cultural phases and this will be reflected in the worked edged of the cobble. This is the one place on an edged cobble where the intention of the user interacts with the environment.

Edged cobbles are often described as crude, non-curated, expedient, but also versatile and reliable lithic tools. But since they are made from readily available raw materials and require little technological capability to create, they are treated as simple tools. I propose to use design theory to demonstrate that there is a complex decision making process involved with creating and using this simple tool. The goal of design theory analysis is to make cultural inferences regarding the decision-making processes of individuals who created and used tools (Ewonus 2009:92). Design theory acknowledges that functional, economic, and social constraints exist and influence the decision-making process. Ewonus (2009:92, Figure 7) identified several constraints such as raw material physical properties and availability, functional efficiency, technological capability, the quantity of materials to be processed, the time available for processing, the consequences of failure, mobility and transport (size and weight), ideology, and prestige. He also identified design considerations, such as reliability, maintainability, longevity, versatility, and flexibility.

By applying design theory analysis, experimental archaeology, and use-wear analysis to the Cherry Point edged cobble assemblage, I hope to understand how the decisions were made in choosing which cobble would make the best edged cobble for a particular task, when to resharpen an edged cobble for further use, and when an edged cobble was no longer useful as a tool.

Hypotheses

During the Locarno Beach to Marpole transition in the Salish Sea, several sites see an increase in the number of large adze blades and decrease in the number of edged cobbles (e.g. Gaston 1970, Grabert 1979, and Roulette 1989). Roulette (1989) states that there is higher frequency of edged cobbles in earlier cultural components and in later cultural components there is a decrease in edged cobble numbers and an increase in adze blades. He (1989:91) also states that "While the occurrence of large adze blades in Marpole components may signal the beginning of the replacement of the cobble chopper by the adze the shift did not occur all at once. However, by the end of the Marpole phase (circa 1,600 years ago) the replacement was complete. As a result of the replacement cobble choppers ceased to be used in procurement tasks…" If that is the case, then why are edged cobbles still found in post-

Locarno Beach cultural components? In the previous research, no testing was conducted to determine if edged cobbles had been used a material other than bone or wood. I propose that edged cobbles were also used to modify stone and at Cherry Point were part of the tool kit in the manufacture of stone weights. The persistence of this tool in post-Locarno Beach cultural components could be due to an increase in fishing and the need for stone weights, and the possible other pecked large stone artifacts, such as the stone bowls associated with Marpole cultural phase. The goal of my research is to recognize attributes that I could use to make cultural inferences regarding the decision-making process of the Cherry Point occupants as they manufactured, used, broke, resharpened, and discarded the tools.

In my research I am testing two hypotheses:

1.) That edged cobbles were used at Cherry Point in the manufacture of stone weights as suggested by Schwartz and Grabert (1973) and Roulette (1989).

Test implications: a) Because stone weight manufacture was an important activity at the site, edged cobbles with edge damage consistent with use on stone will dominate (compromise 50% or more) of the Cherry Point edged cobble assemblage,

b). Edged cobbles with edge damage consistent with use on stone will be strongly associated spatially with stone weights, and

2.) The number of edged cobbles found in post-Locarno Beach cultural phases at Cherry Point will be comparable to the number found in the Locarno Beach or earlier cultural phases and that a higher proportion would have edge damage consistent with stone modification.

CHAPTER 3: RESEARCH METHODS

Pivotal to my analysis is the identification of specific edge damage attributes that correlate to either wood or stone. Ideally, I would be able to identify such attributes and they would have the potential for redundancy and could readily be assigned to behavioral correlates with high probability. In order to define edge damage attributes, I took a two-part approach with my research methods: replicative experiments to develop criteria for distinguishing use wear on stone versus wood; and an analysis that applied these criteria to the Cherry Point edged cobbles.

The experimental part of my research is a critical method because it allowed me to make comparisons between the use wear on the replicated edged cobbles with the use wear on the Cherry Point edged cobbles. My replicative experiment consisted of replication, use, and resharpening of edged cobbles. I replicated thirty-six edged cobbles and experimentally used them on stone and wood. I also resharpened six of the replicated edged cobbles to ascertain if I would be able to deduce the number of times an edged cobble was sharpened. The differences in edge damage on my experimental tools were documented and photographed. Using the experimental cobbles and photographs, I will be able to match the edge damage on the artifacts and infer that the processes were the same or similar in the past. This chapter concludes with a description of the morphological and metric data collection applied to the archaeological specimens.

<u>Research Framework for Replicative Experiment</u>

The goal of my replicative experiment was to find elements of use wear diagnostic of using edged cobbles on stone versus wood. I could then use these behavioral correlates to interpret use wear on the Cherry Point edged cobbles. To accomplish this, I replicated edged cobbles similar to those found in the Cherry Point assemblage and used a sample of them for chopping wood and battering stone. According to Binford (1983:417-418), for these behavioral correlates to be clear, it must be demonstrable in a "contemporary setting" that the agents producing these diagnostic attributes are clearly recognizable. Replicative flintknapping studies have proven to be reliable for identifying agents responsible for the patterns noted in the archaeological record (Flenniken 1980). Binford (1983:418) also states “for an inference about the past to be of high probability, an additional proposition must be met--that the same relationship obtained in the past as obtained in the present." I used this line of thinking as the framework for identifying attributes of edged cobbles from Cherry Point. Binford’s statement is an observation about how technological analyses actually replicate prehistoric behaviors. A reasonable approximation of the past agents that produced the technological attributes is sufficient to allow the development of behavioral correlates that can provide an acceptable level of inference about archaeological collections.

To my knowledge, no experimental work has been conducted to determine if edged cobbles could be used effectively to peck stone and what the consequent wear patterns would look like under macroscopic analysis. My experimental program was constructed to determine if distinctive patterns of edge modification would occur on an edged cobble last used to modify stone versus wood. It is reasonable to expect a difference, but previous research did not recognize any clear criteria. I needed to confirm there was a difference and I would not know the details without my replicative experiments.

Replication

For the first part of my experiment, I created edged cobbles, replicating the size, material types, and edge types of the archaeological specimens, and used them on wood and stone.

My experiment followed Crabtree’s (1975:106) concept of replication: “replication is reproducing stone tools, using the aboriginal artifacts as controls, using stoneworking fabricators similar to the ones in aboriginal use, employing the same raw materials, and following what can be demonstrated to be the same reduction technology. The end products, including debitage, sequential stages of manufacture, and rejuvenated tools should be the same or very similar to the aboriginal controls in terms of technical category percentages, morphologies, and technologies.”

Sampling of Beach Cobbles

In 2015, after completing my analysis, I conducted a systematic sample of the cobble beach in front of Cherry Point in order to establish a baseline of measurements and material type counts for unmodified cobbles to compare the archaeological edged cobbles. I set up 15 1x1 meter sample units in a staggered formation along the cobble beach at different elevations (Figure 7). Unfortunately, I did not have a 1x1 meter grid and only one tape measure so I fashioned a 1x1 meter square using two pieces of twine and two pieces of driftwood (Figure 8).

The first step in my sampling process was to get a count of the material types of the cobbles. I only counted cobbles that were easily removed, so I did not count any cobbles that I could only access if I moved several other cobbles or cobbles that were partially buried. I counted a total of 1500 cobbles with a low count of 73 in Sample Unit #13 and a high count of 151 in Sample Unit #6. Of the 1500, quartzite cobbles composed approximately 68% of the material, granite and other coarse-grained materials made up about 31% of the material, and fine-grained volcanic (FGV) made up just over 1%.

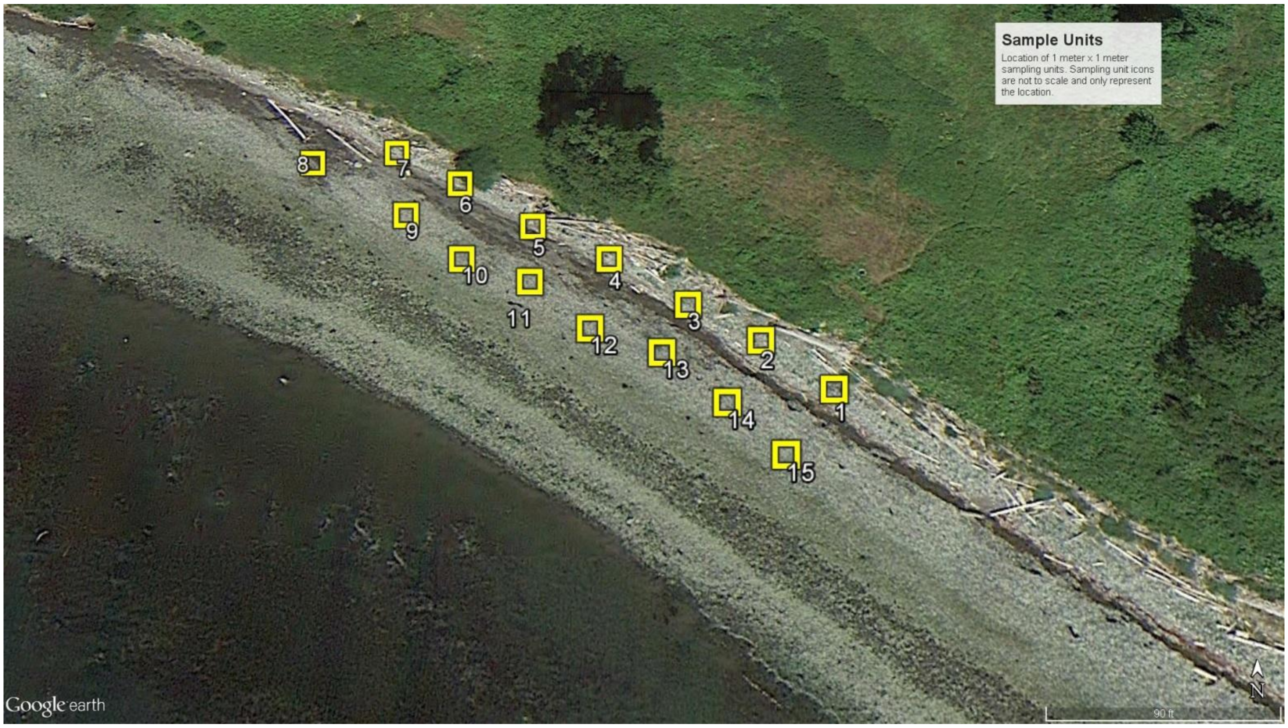

Figure 7: Plan view of the locations of 1x1 meter sampling units. The yellow square icons only denote the location of the sample units and are not to scale.


Figure 8: Overview of my 1x1 meter square.

The next step in my sampling process was to measure the length, width, and thickness of 20 cobbles from each sampling unit, for a total of 300 cobbles. I did not weigh the cobbles because I did not have a portable scale on hand. I chose cobbles from all over the unit and only measured cobbles that I included in my material count. The average length for the cobbles is 11.5 cm with a range of 6 cm to 18 cm; the average width is 8.5 cm with a range of 3 cm to 14 cm; and the average thickness is 4.8 cm with a range of 3 cm to 8 cm.

Selection of Raw Materials

The first step in my replicative process (accomplished in 2011) was to collect cobbles that I would flake to make edged cobbles. The search criteria I set were to find cobbles that were approximately the same size, shape, weight, and material of the Cherry Point edged cobbles as well as how comfortable the cobble felt in my hand. I was able to find 42 quartzite cobbles from the cobble beach adjacent to Cherry Point that were good matches, but the cobble selection was more time intensive than I anticipated.

I selected cobbles that could be flaked multiple times, had decent heft, and felt comfortable in my hand. The average metric measurements for the quartzite cobbles I collected are 12.3 cm (length) x 9.7 cm (width) x 4.9 cm (thickness) x 934.4 g (weight). When compared to the average metrics for the Cherry Point quartzite edged cobbles (8.8 cm long x 9.1 cm wide x 4.8 cm thick x 564.2 grams heavy), it is no surprise that the average metrics of the unmodified quartzite cobbles are larger since the creation and use of an edged cobble is a reductive activity.

Replication of Edged Cobbles

Using hard-hammer percussion, I removed one or more flakes from one side of the quartzite cobbles to create a sharp worked edge (Figure 9). I repeated this process for 36 of the 42 quartzite cobbles. The remaining six quartzite cobbles were set aside for my resharpening experiment. The average metric measurements for the replicated edged cobbles are 10.6 cm (length) x 9.8 cm (width) x 4.7 cm (thickness) x 916.5 g (weight) x 69° (edge angle).

Figure 9: Overview of replicated edged cobble.

Using the replicated edged cobbles, I attempted to perforate a slab of sandstone and chop through a piece of dried driftwood (Figure 10). I chose to use sandstone because Easton (1985) noted that at the Bedwell Harbour, Point Roberts and/or Village Point, and Active Pass sites, sandstone was one of the materials used to make anchor weights. I chose to use driftwood because it was easily procured and I did not want to chop down a live tree.

Figure 10: Using a replicated edged cobble on stone (left) and wood (right).

I separated the 36 edged cobbles into two groups of eighteen: Group A and Group B. I hypothesized that Cherry Point edged cobbles were used on either stone or wood, but I wanted to know if I could identify if an edged cobble was used on both by examining the damage to the worked edge. In order to determine if I could do this, I used Group A on wood first, hitting the cobbles against a piece of driftwood with 100 strikes. I then resharpened the worked edge and used them to modify stone by hitting them against a flat piece of sandstone with 100 strikes. I documented the edge damage after each step of the experiment, first following the 100 strikes on wood, second following the resharpening episode and third following the 100 strikes on stone. I repeated these same steps using the replicated cobbles from Group B, except I used them to first strike stone 100 times, then resharpened, and lastly used them to strike wood 100 times.

Below is a table summarizing my observations of the worked edge after completing the replicative experiment for Groups A and B. My main observations included two different edge damage types: a slightly rounded worked edge from striking wood; and a flattened worked edge from striking stone. One interesting trait I noticed in Group A was a series of shallow flake scars on the underside of the worked edge caused by striking on stone. In Group A, the flake scars did not appear when striking on wood or following resharpening; I only observed them after striking on stone. In Group B, I observed similar flake scars on the underside of the worked edges, but again, only after striking stone. Interestingly, when I resharpened the edged cobbles several of them still had part of the shallow flake scars present on the underside of the worked edge. These scars were still present even after the 100 strikes on the driftwood.

On several of the replicated edged cobbles I observed a combination of edge damage. In some instances only part of the worked edge was flattened or rounded; the rest of the worked edge remained sharp. At first, I was surprised by the combination of edge damage but after reviewing videos of myself hitting the driftwood and sandstone with the replicated edged cobbles, I noticed that I did not use the whole worked edge when I chopped; I favored the part of the worked edge that provided the best angle to chop the stone or wood, which ended up being one of the corners, and not the center of the worked edge. This combination only occurred on a new or resharpened worked edge. The implications of this observation are that some of the archaeological specimens may have these combination worked edge. This will also show that user preferred to use part of the worked edge as opposed to the whole worked edge. As I indicated earlier, edged cobbles choppers are imbedded in a dynamic lithic reduction framework and the multiple variations of this tool may help explain the behaviors or intentions of the site occupants.

To summarize, the results of this experiment showed there is a relationship between the type of material an edged cobble was last used to modify and the worked edge damage:

1) When a replicated edged cobble was last used to modify stone before it was deposited into the archaeological record, the worked edge was flattened or a combination of flattened and sharp
2) When a replicated edged cobble was last used to modify stone before it was deposited into the archaeological record, the worked edge was rounded or a combination of rounded and sharp
3) When a replicated edged cobble had a newly created or resharpened edge, the worked edge was sharp. There is no evidence that any part of the worked edge is rounded or flattened.

A detailed description of each edge type is in the Edge Damage and Resharpening section.

Analysis of Archaeological Specimens

Using information on edge damage and resharpening derived from my experimental work, combined with other morphological and spatial attributes, I will be able to deduce how the Cherry Point edged cobbles were used prehistorically. I measured the physical dimensions of each edged cobble not only to determine if morphology was standardized, but because it allows comparison with other assemblages, is relevant to replication, and relates to some extent to edged cobble mass.

Sample Selection

I used the Cherry Point artifact catalog as a guide to locating the edged cobbles for my analysis. Entries described as cobble choppers were common, but I found that the artifact descriptions in the catalogue were not standardized and varied over the field seasons. Therefore I decided to examine all artifacts that could generally be called a large cobble artifact, which included artifacts described in the catalogue as cobble choppers, hammerstones, anvil stones, and cobble bashers. I examined 509 large cobble artifacts recovered from Cherry Point during the eight archaeological field schools. Of these, 337 met the definition of an edged cobble (Borden 1968a, Haley 1987, Roulette 1985, Stewart 1973): a water-rounded cobble with a unifacial edge created by hard-hammer percussion.

Attribute Analysis

I chose the following edged cobble variables to analyze in order to get a better understanding of how the occupants at Cherry Point used edged cobbles.

Material Type

Cobble material types are categorized in the broadest geologic category. Cryptocrystalline silica (CCS) is used for cherts, flints and jaspers and varies in color. Fine-grained volcanic rock (FGV) is used for basalt, dacite and andacite. Metasediment is used for fine-grained dark rocks with bedding planes and conchoidal fractures. Quartzite is a metamorphic rock often found in the form of cobbles, which can be fine-grained or coarse-grained and varies in color.

Metric Variables

Physical dimensions (length, width, thickness, weight, and edge angle) will allow me to determine if the morphology of edged cobbles were standardized. Length, width and thickness are measured with digital calipers and recorded in centimeters to two decimal places. Length is taken from the midline worked edge to the opposite end of the cobble and width is perpendicular to the length (Figure 11). Since an edged cobble's worked edge is the most prominent feature and the part that interacts with stone or wood, I chose to measure length this way because I believe an unmodified cobble was selected and flaked to maximize its usefulness as an edged cobble.

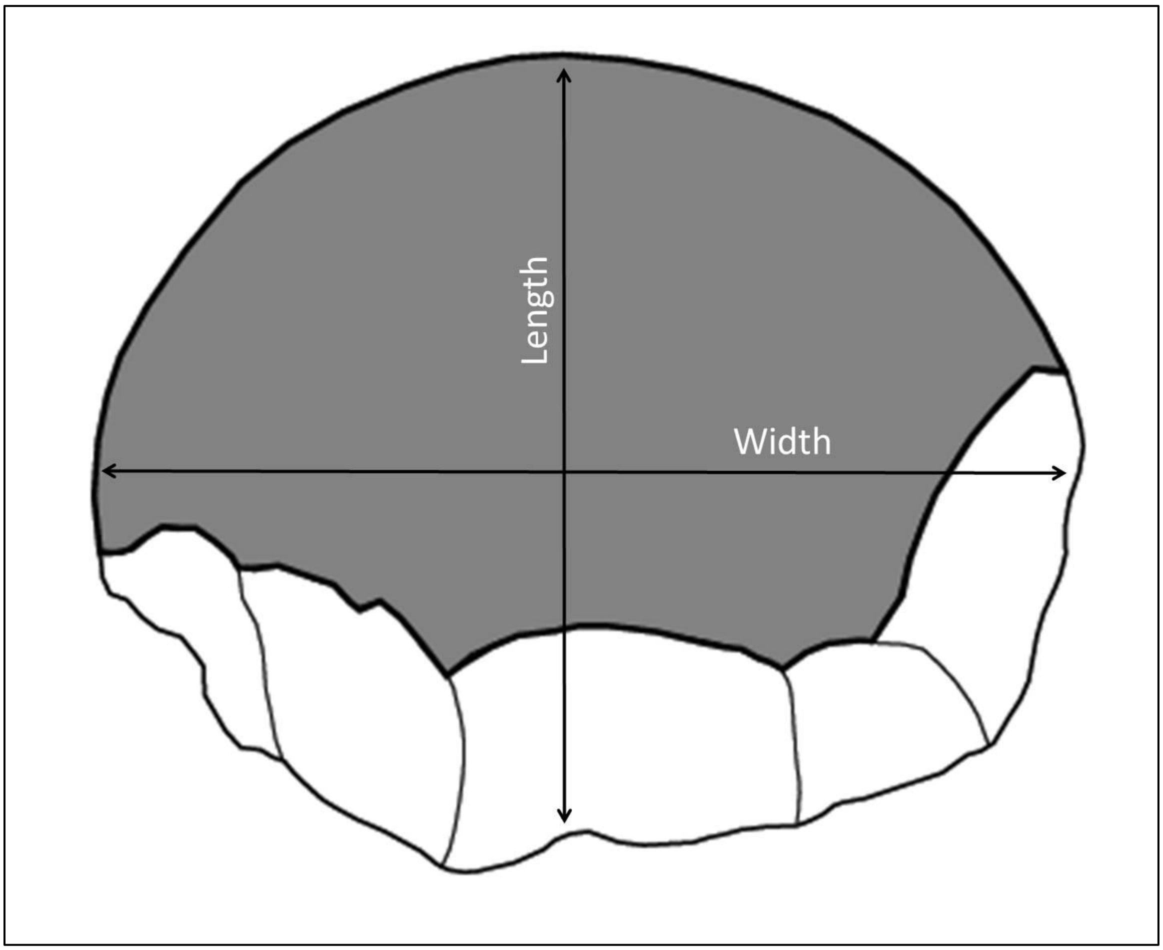

Figure 11: Plan view of edged cobble showing length and width dimensions.

Thickness is taken from the thickest part of the cobble (Figure 12). Weight was taken on a Fisher Scientific XT Top Loading Balance digital scale and recorded in grams to two decimal places.

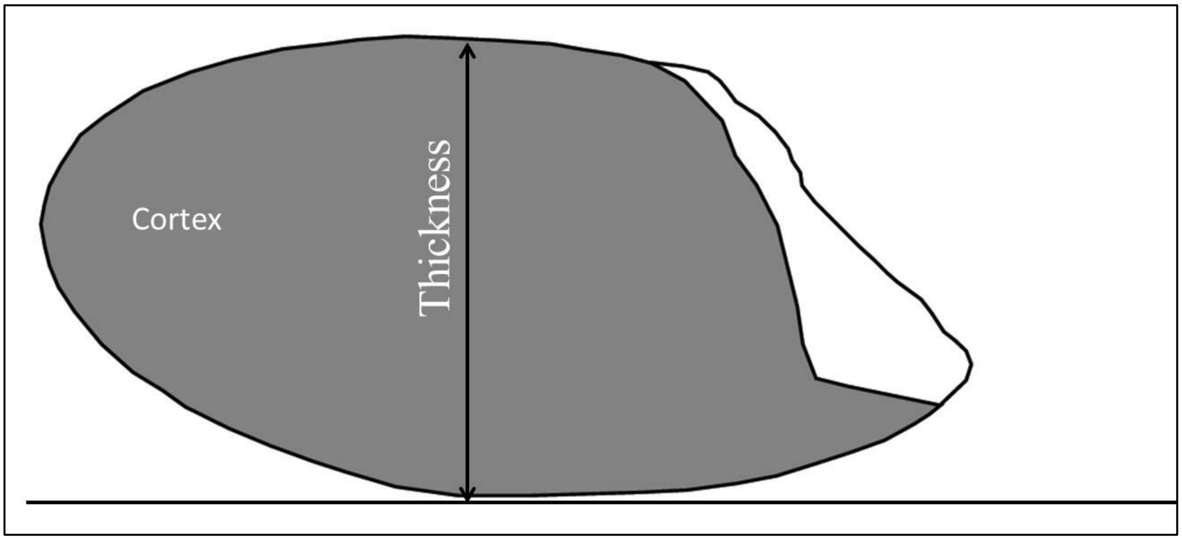

Figure 12: Profile view of thickness dimension.

Edge Angle was measured using a pitch and angle locator. The edged cobble is placed on a flat, level surface and the angle locator was positioned in the center of the face of the worked edge (Figure 13).

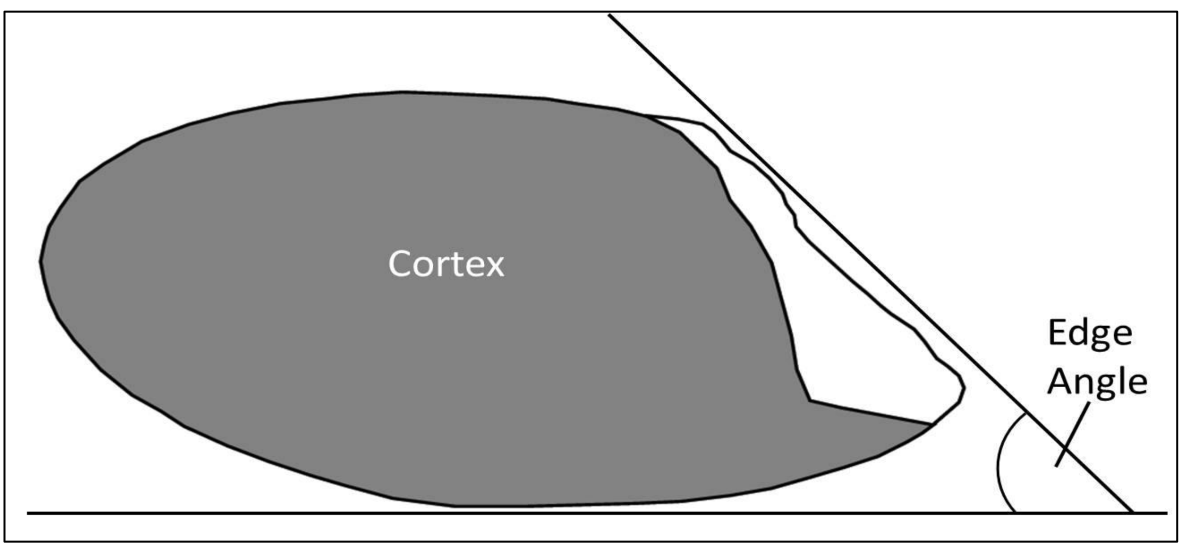

Figure 13: Profile view of edge angle.

Edge Damage and Resharpening

The results of my experiment showed visible difference of edge damage between modifications of wood versus stone. Also, I noticed that if an edged cobble is newly created or resharpened but never used, the worked edge exhibits characteristics different than the worked edge of a used edge cobble. The following sections describe the three worked edge types.

Battered

A battered edge has shallow flake scars on the ventral side of edge. This type of flake scar is a result of stone-on-stone impact regardless of angle of impact and edged cobble material type. The edge feels smooth to the touch and crushing may be present. In plan view of the cortical face, the edge is straight (Figure 14, left). In profile view, the edge is squared off (Figure 14, right). There might be shallow flake scars on the cortical face opposite the edge (Figure 15).

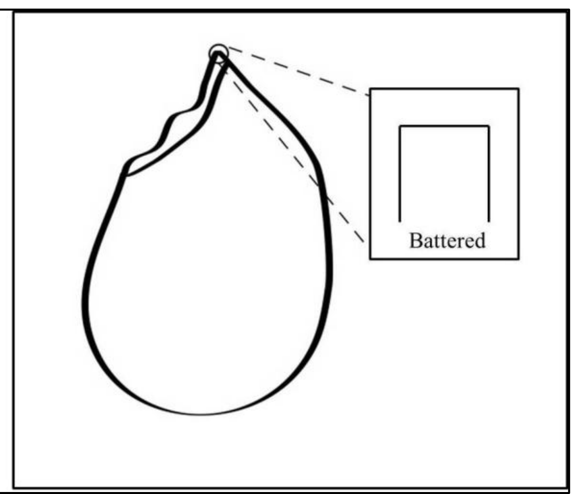

Figure 14: Plan (left) and profile (right) views of a battered edged cobble.

Figure 15: Close-up of shallow flake scars on the cortical face opposite the worked edge.

Blunted

This type of edge damage was consistently found on the replicated edged cobbles last used on wood. In a plan view of the bottom of the worked edge, edge is sinuous but not well defined (Figure 16, left). In profile view, the whole edge is rounded like an inverted "U" (Figure 16, right). There are no shallow flake scars on the bottom side of this edge. Protruding points are still visible, but are not sharp to the touch.

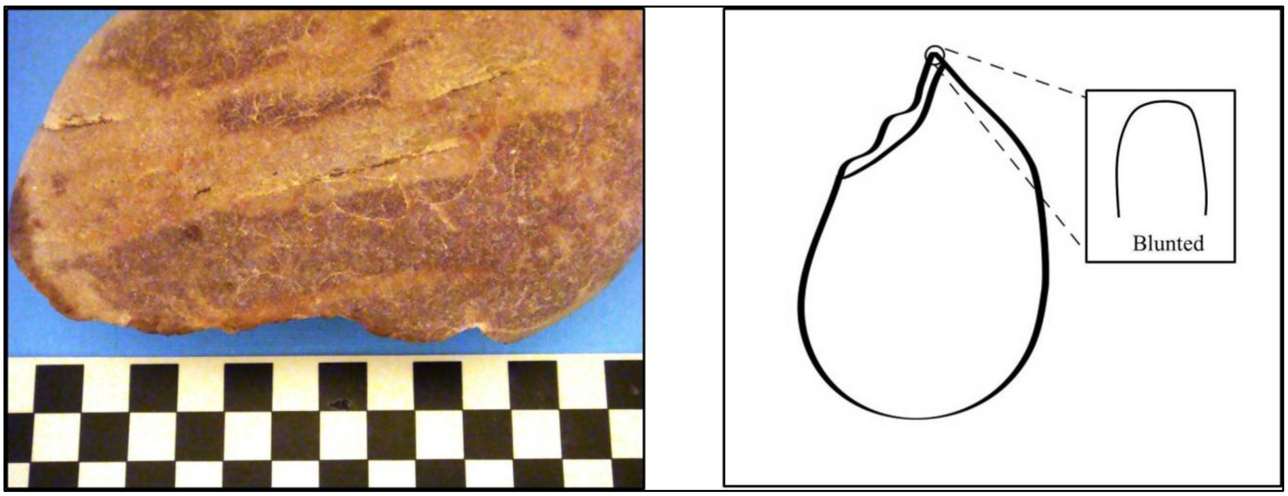

Figure 16: Plan (left) and profile (right) views of a blunted edge cobble.

Sharp

This edge may be a result of an initial edge creation or an edge resharpening episode. In a plan view of the bottom of the edged cobble, the edge is very sinuous due to the flake scars and well defined (Figure 17, left). The edge is sharp to the touch and has protruding points. In profile view, the edge is peaked like an inverted “V” (Figure 17, right). If the edged cobble was newly created or sharpened before it was deposited in the archaeological record, then the entire worked edge would be sharp.

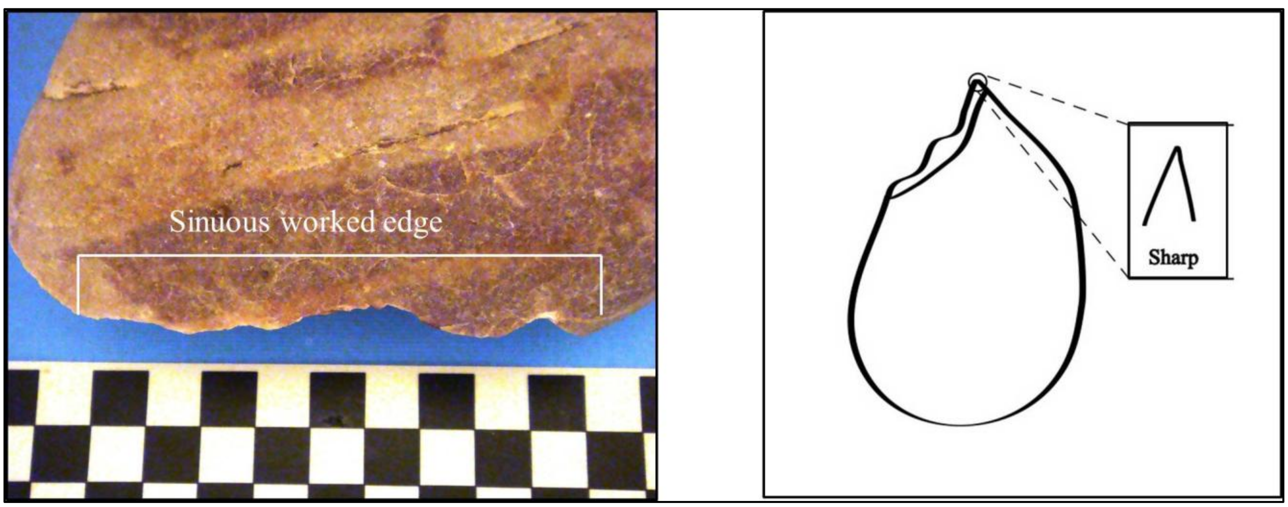

Figure 17: Plan (left) and profile (right) views of a sharp edged cobble.

Resharpening

According to Haley (1996), when a worked edge became dulled after use it could be resharpened to prolong the use of the edged cobble. A resharpening episode is used to create a new sharp edge for a used and/or worn worked edge on a flaked tool. Edge resharpening is defined as the presence of additional flake removals from a previously flaked edge of a tool, usually to create a better working edge. This retouch produces flake scars that overlap previous scars that move away from the worked edge. The higher the edge angle, the more difficult to resharpen and a higher incidence of hinge and step fractures resulting in shorter flakes being detached.

I wanted to determine if I could discern if an edged cobble had been resharpened and if so, how many times. Several of the archaeological specimens had at least three separate planes of flake scars which I associated with three separate resharpening episodes. To determine if a resharpening episode left a consistent flake scar pattern, I used six replicated edged cobbles for the resharpening experiment, I painted the flaked face of a replicated edged cobble white (Figure 18, Step 3), resharpened it by using hard hammer percussion (Figure 18, Step 4), painted the new flake scars yellow (Figure 18, Step 5), and then resharpened it again (Figure 18, Step 6).

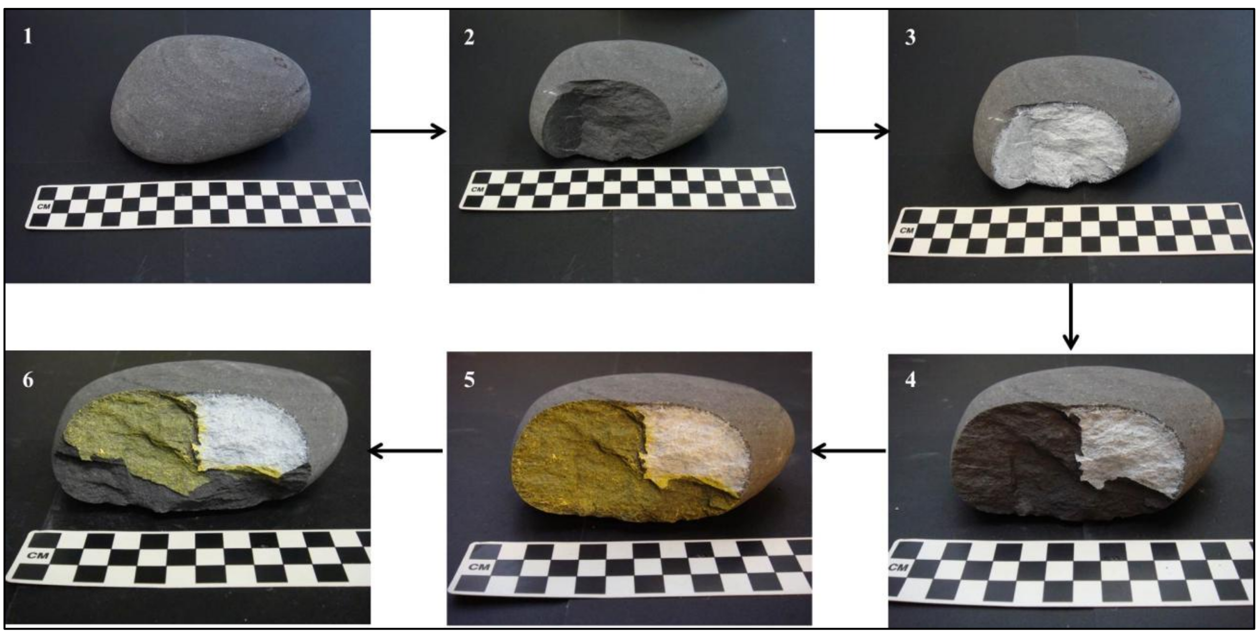

Figure 18: Stages of replicated edged cobble resharpening.

I noticed the patterning of flake scars was not consistent with each resharpening experiment. I expected the flake scar pattern to be located near the bottom of the worked edge face, but this only happened when the worked edge angle became too steep. Due to the inconsistency in flake scar patterning, I could only determine if an edged cobble had or had not been resharpened. I was unable to decipher how many times an edged cobble was resharpened. However, future research could focus on the resharpening of edged cobbles with specific parameters for the worked edge.

Spatial

I used the artifact catalogue to determine which cut, unit, level, and when possible the exact depth where an edged cobble was found during the excavations. After I gathered this information, I entered it into an excel sheet (Appendix B) and created a GIS database. Using this database, I was able to add the counts for each of my edged cobble types for each excavation cut. Using this method, I also gathered the same information for complete, broken, and unfinished stone weights.

Temporal

For the temporal aspect of my analysis, I adopted Dubeau's (2012) Cherry Point temporal analytic unit (AU) model. I renamed Dubeau's AU1 to the Locarno Beach AU (3200-2400 BP) and AU2 to post-Locarno Beach AU (2400-0 BP). In order to establish which AU an edged cobble was located in, I used the 20 cm level assigned to each one. I also assigned AUs to several excavation cuts that Dubeau (2012) did not consider. I did not analyze stratigraphy and made conservative assignments base on direct association with radiocarbon dates. The AUs used for my analyses are listed in Table 1. The 20 radiocarbon dates (Appendix A) are from 17 excavation cuts. Nine radiocarbon dates fall within the Locarno Beach AU and the remaining eleven are in the post-Locarno Beach AU. Three excavation cuts (S1W10, S16E17, and S21E29) had two radiocarbon samples collected, but only S1W10 had radiocarbon samples that dated to both AUs.

Table 1: Analytical units, excavation cuts, and depth of radiocarbon sample. * denotes cut with both analytical units present. Actual dates are in Appendix A.

Analytical Unit	Excavation Cut	Depth (cm) of where radiocarbon sample was taken
Locarno Beach	N3W9	36
	S1W10*	80-100
	S1E1	60-80
	S4E1	50
	S4W4	50
	S10E13	80-100
	S11E5	40-60
	S16E17	40-60
		80-100
post-Locarno Beach	S1W10*	60-80
	S3W4	60-80
	S7E8	160-175
	S8E8	80-100
	S9E4	20-40
	S9E19	40-60
	S21E29	40-60
		80-100
	S22E27	60-80
	S24E27	120-140
	S24E29	70

CHAPTER 4: RESULTS

In this chapter, I discuss the results of my analysis of the Cherry Point edged cobble assemblage focusing on tool morphology, material type, edge damage type, resharpening, and the statistical relationships between these variables. In addition, I look at the spatial association of edged cobbles with stone weights, and how these vary temporally. These analyses provide a better understanding of the manufacture, use, and maintenance of edged cobbles at Cherry Point for over two millennia.

Cherry Point Edged Cobble Assemblage

The edged cobble assemblage analyzed here comprised 337 artifacts. They were from contexts widely distributed across the site, from 48 of the 72 excavated cuts. Their spatial distribution will be considered in more detail later in this chapter. As described in the previous chapter, I analyzed the following attributes of the edged cobbles: material type, morphology (metric measurements of length, width, thickness, weight, edge angle), edge types, and resharpening.

Material Type

In order to determine if there was a preference for a particular material type to manufacture edged cobbles, I calculated the percentages for each material. The edged cobble assemblage is primarily composed of quartzite (~77%), fine-grained volcanic rock (FGV) (~20%), metasediment (~1%), granite and other coarse-grained materials (~1%), sandstone (<1%), and serpentine (<1%) (Table 2).

Table 2: Edged cobble count and percentage by material type.

Material	N	%
FGV	69	20.5%
Granite and other coarse-grained materials	3	0.9%
Metasediment	3	0.9%
Quartzite	260	77.2%
Sandstone	1	0.3%
Serpentine	1	0.3%

The number of quartzite edged cobbles is more than triple the number of FGV edged cobbles (260:69). I compared these percentages to that of my beach sample (Table 3) and quartzite is the material with the highest percentage in both cases.

Table 3: Comparison of material type percentages for beach sampling and the Cherry Point edged cobbles.

	FGV	Granite and other coarse-grained materials	Quartzite
Beach sampling (n=1500)	1.2%	30.9%	67.9%
Cherry Point (n=337)	20.5%	0.9%	77.2%

This bias towards the use of quartzite cobbles at Cherry Point could have been due to the flakability and durability of the material or the abundance on the adjacent cobble beach as noted in my sampling of the cobble beach. The difference in FGV percentages suggest that the occupants at Cherry Point were searching for this type of material. It is also worth noting that while granite and other coarse-grained materials made up just over 30% of the material found in my samples, it only makes up almost 1% of the edged cobble assemblage. More than likely this is due to the granular nature of the rock which is not conducive to holding a sharp edge.

Tool Morphology

As is typical for edged cobbles in the Pacific Northwest, the artifacts are made on naturally formed rounded cobbles that are generally discoidal in shape, which is round to oval and substantially thinner in one dimension. Edged cobbles are unifacially flaked on one edge, but the location of the flaked edge does vary between the long or short axis of the edged cobble. The first question I wanted to answer was “Do the Cherry Point edged cobbles have a standardized morphology?” In order to determine this, I used the Eerkens and Bettinger (2001) standardization model. Their model uses the Weber fraction for line length estimation to “derive a constant for the coefficient of variation (CV=1.7 percent) that represents the highest degree of standardization attainable through manual human reproduction of artifacts.” They also determined the coefficient of variation that “represents variation expected when production is random (CV=57.7 percent).” Using these two CVs as boundaries, they suggested that a lower CV is indicative of artifact standardization. I calculated the CV for each measurement and the results show that all but the weight measurement has a CV in the 20s. With a CV of 55.6%, weight appears to be non-factor for edged cobbles, which is peculiar since it is assumed that weight is the reason one this tool is used for heavy-duty chopping activities.

In Table 4, I ranked the variables from lowest CV to highest CV. Length and edge angle has nearly identical CVs and since these two variables are most affected by use and modification, I assume that the users and makers of the created and modified edged cobbles to a preferred length and edge angle. Although width has the lowest CV, it is also the variable less likely to be affect by use and modification. This low CV is probably a result of selecting cobbles that fall within a certain size range. It is interesting that weight has a CV that is near random because since the prevailing thought is that its weight makes it ideal for heavy-duty chopping tasks.

Table 4: Ranking of variables by their coefficient of variation for edged cobbles.

Variable	n	Mean	Standard Deviation (SD)	Coefficient of Variation (CV)
Total Width (cm)	337	9.13	1.99	21.7%
Total Length (cm)	337	8.71	2.11	24.2%
Edge Angle (º)	337	63.91	15.52	24.3%
Maximum Thickness (cm)	337	4.73	1.22	25.9%
Weight (g)	337	552.5	307.34	55.6%

The result shows that edged cobbles have a standardized shape as measured by length, width, thickness, and edge angle, but allowed for variation in weight. I also interpret that width and thickness are more indicative of the selection process for unmodified cobbles. Since most of the CVs fall in the low-to-mid 20s range, I suggest that the size and shape of edged cobbles were standardized.

In Table 5, I compared the CVs for the unmodified cobbles I measured during my beach sampling and the Cherry Point edged cobbles. The results indicate that the unmodified cobbles had a consistent length, width, and thickness, more so than the edged cobbles.

Table 5: CV comparison of beach sample and the Cherry Point edged cobbles.

	Length CV	Width CV	Thickness CV
Beach sampling (n=300)	19.2%	19.2%	24.3%
Cherry Point (n=337)	24.2%	21.7%	25.9%

This suggests the occupants made these tools to certain specifications and were deliberate in their unmodified cobble selection. This falls in line with the Eerkens and Bettinger (2001) argument that a lower CV is indicative of artifact standardization. Interval graphs for each metric measurement (Figure 19 to Figure 23) show that length, width, thickness, and weight are positively skewed, while edge angle is bimodal.

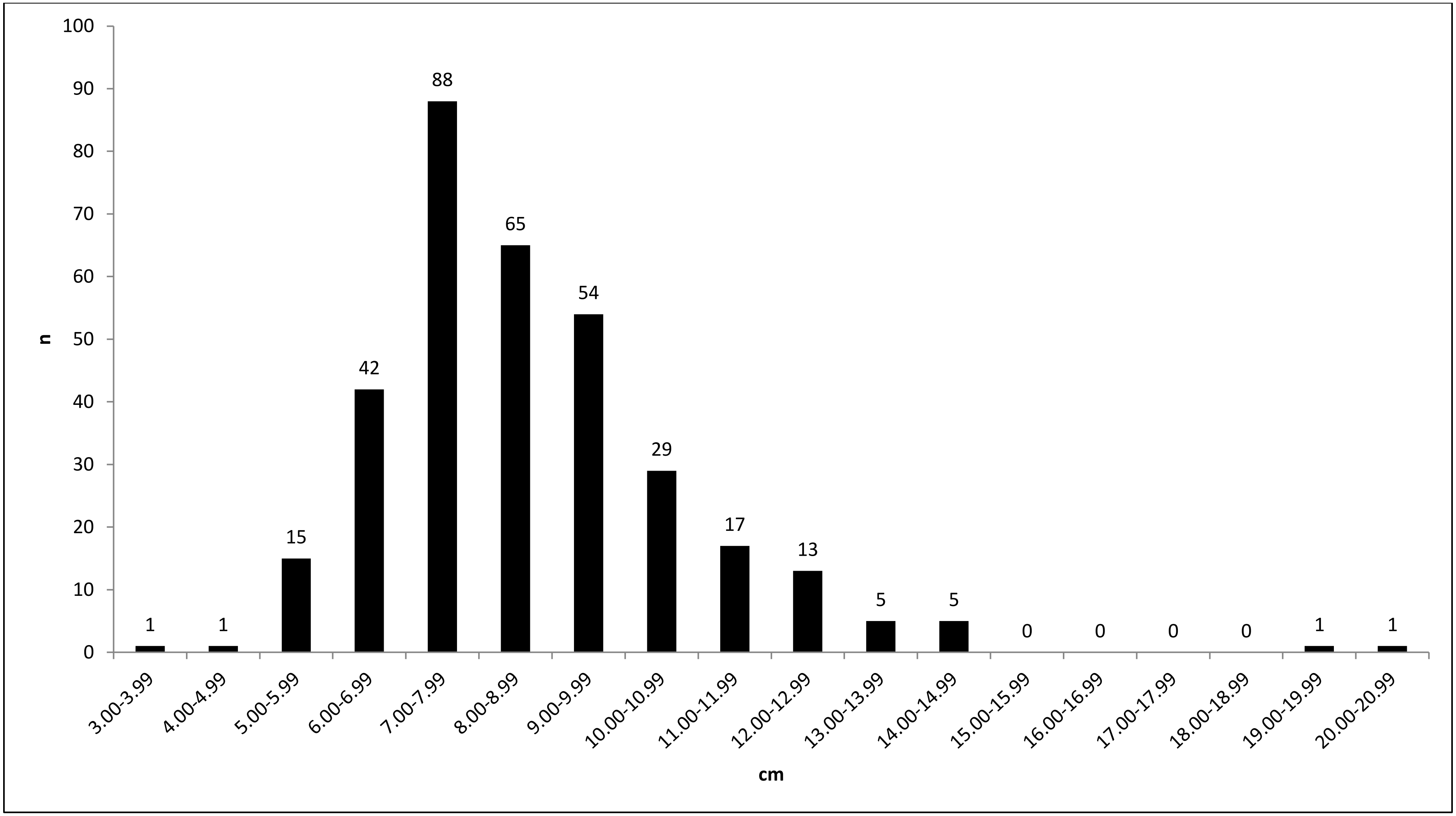

Figure 19: Edged Cobble Length (cm) interval.

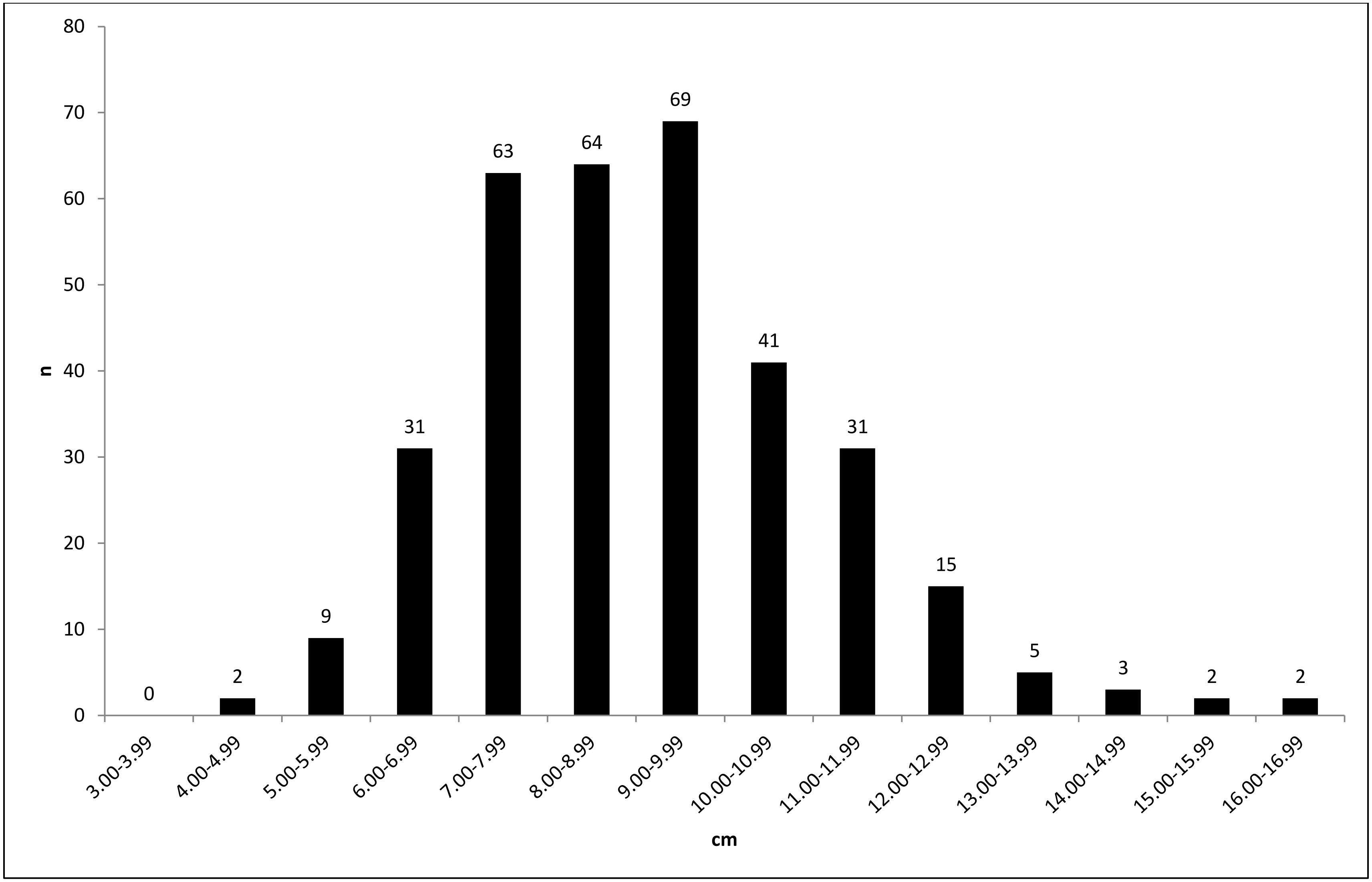

Figure 20: Edged Cobble Width (cm) interval.

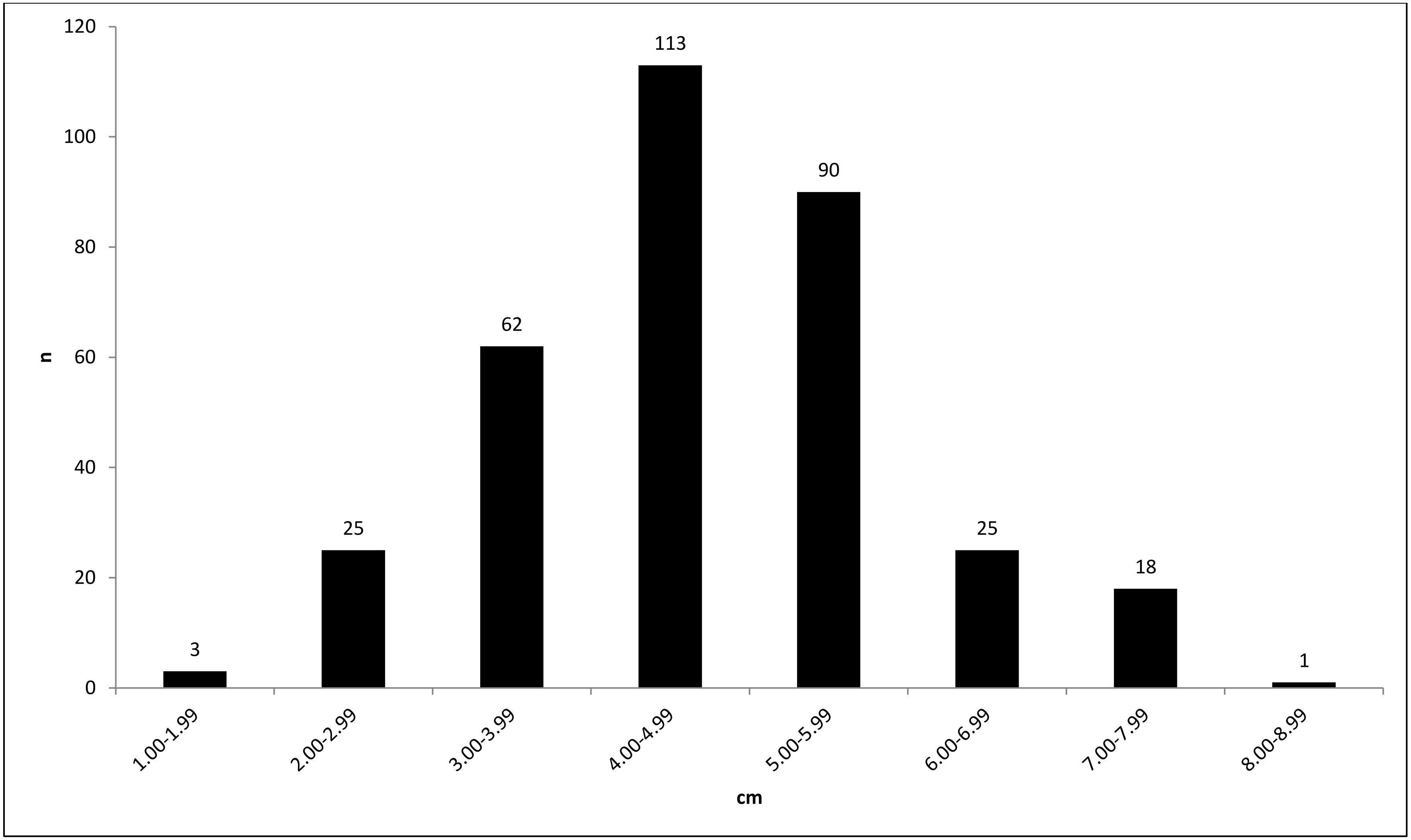

Figure 21: Edged Cobble Thickness (cm) interval.

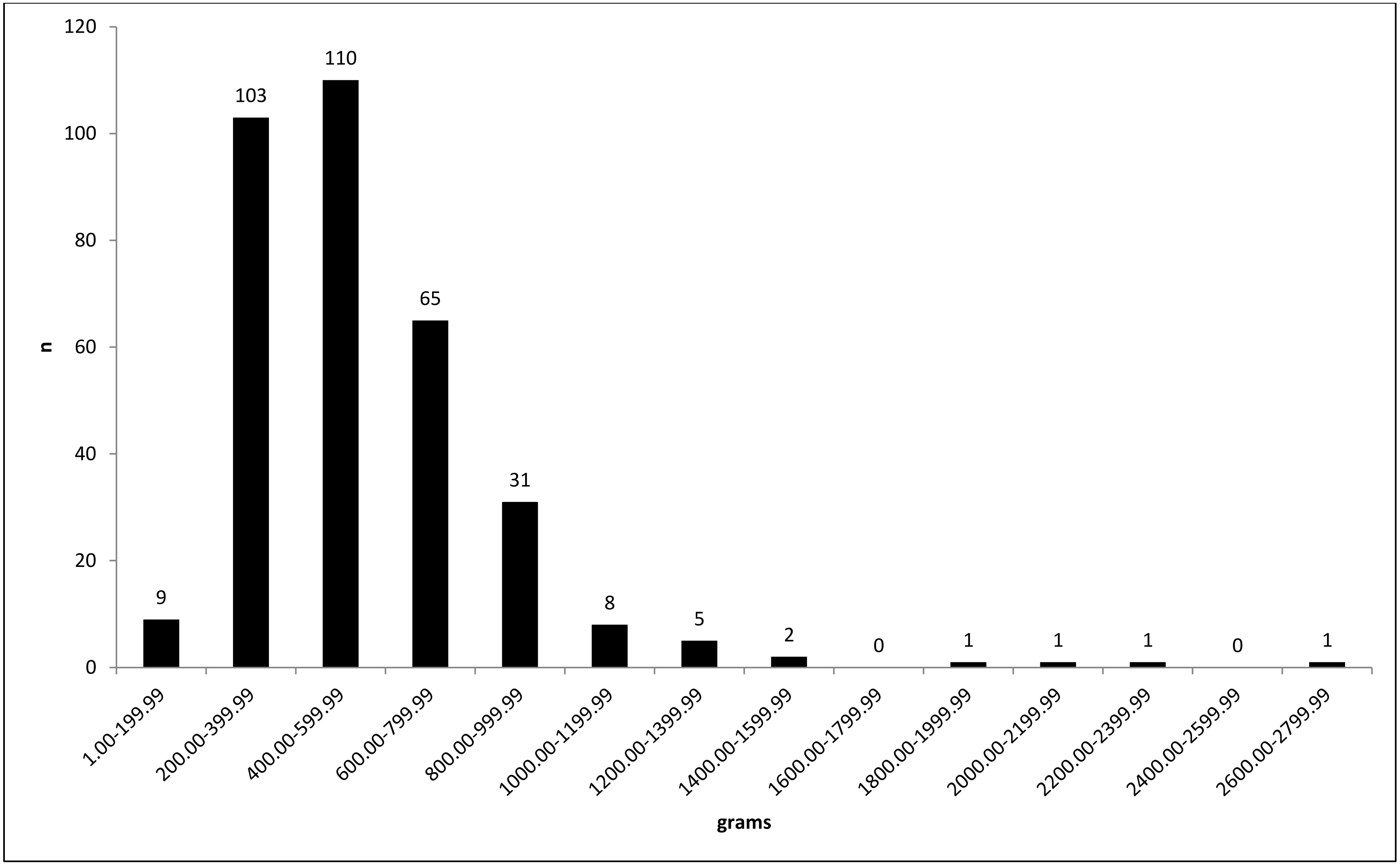

Figure 22: Edged Cobble Weight (g) interval.

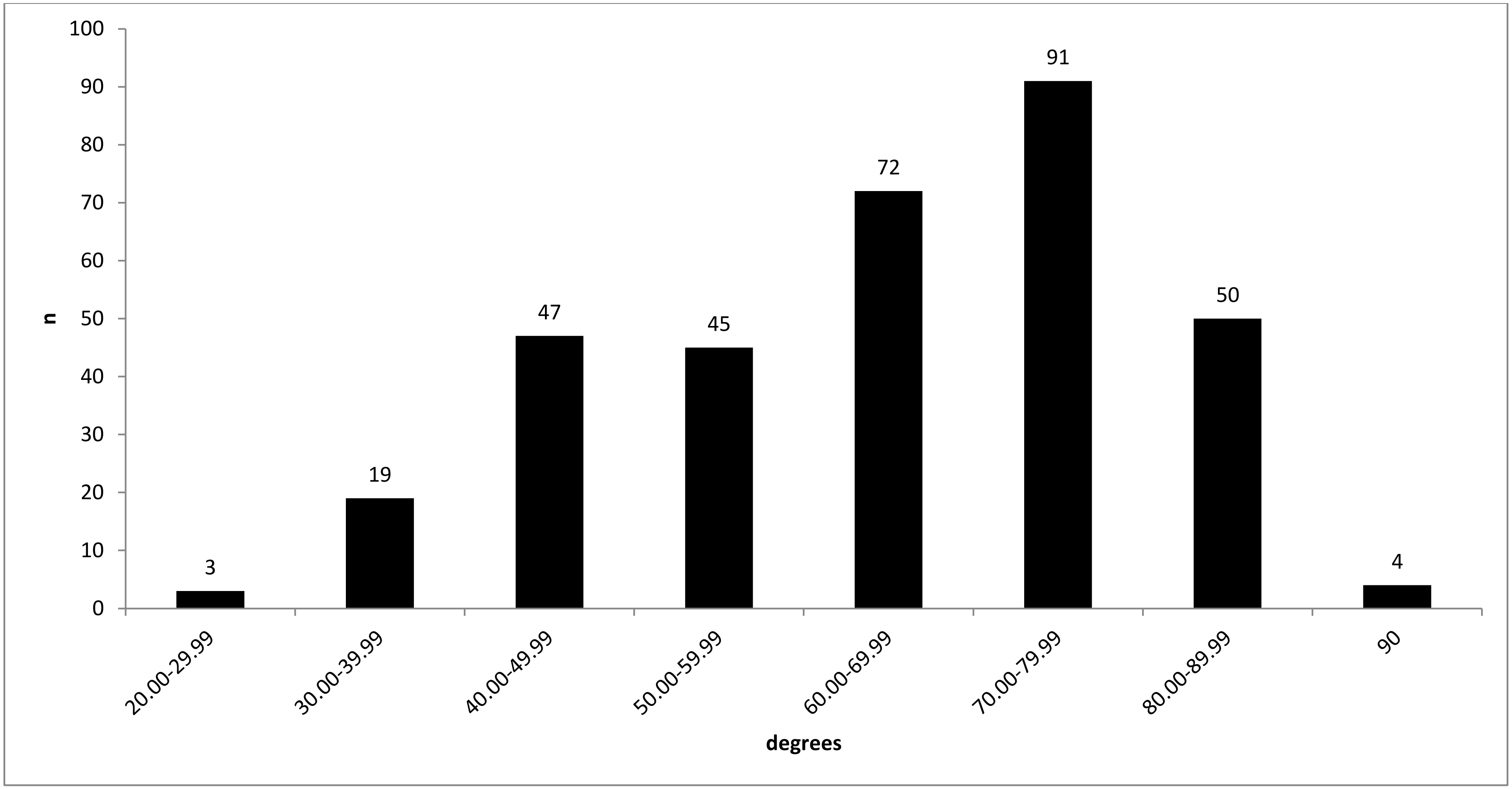

Figure 23: Edged Cobble Edge Angle (°) interval.

Comparing the skewness (Table 6) of each number, thickness and width are the only variables with a more normal distribution in the Cherry Point edged cobble assemblage.

Table 6: Skewness results for metric measurements.

Metric Measurement	Skewness
Length (cm)	1.32529
Width (cm)	0.653368
Thickness (cm)	0.287253
Weight (g)	2.53971
Edge Angle (°)	-0.563584

More than likely, this is a result of the natural constraints of the unmodified cobble and the geometry needed for flintknapping. The significance of the skewing in length and weight could be a result of a decision-making process for selecting an unmodified cobble. Which makes sense because the makers and users are looking for a cobble that has enough heft to be efficient as a heavy duty chopping tool and enough length to create a worked edge. The bimodal distribution of edge angle could reflect that makers and users preferred edged cobbles with worked edge angles that fall within the 40°-49° range and 70°-79°.

I calculated the means and standard deviations for length, width, thickness, weight, and edge angle for FGV and quartzite (Table 7), the only materials with sufficient sample sizes for meaningful comparisons. I chose to omitted granite and other coarse-grained materials, sandstone and serpentine from these and future calculations because I wanted to make compare the archaeological specimens with my replicated edged cobbles.

Table 7: Means and standard deviations by material type.

	FGV (n=69)	Quartzite (n=260)
Mean Length (cm)	8.4	8.8
Standard Deviation	1.6	2.2
Mean Width (cm)	9.2	9.1
Standard Deviation	1.9	2.0
Mean Thickness (cm)	4.6	4.8
Standard Deviation	1.1	1.3
Mean Weight (g)	514.6	564.2
Standard Deviation	222.7	328.4
Mean Edge Angle (°)	63.9	64.1
Standard Deviation	17.4	15.0

I conducted a two-sample *t*-test on each metric measurement for FGV edged cobbles and quartzite edged cobbles to determine if there is a difference in edged cobble length, width, thickness, weight, and edge angle by material type. The results show that there is no significant difference in any of the means between the two material types (Table 8) and therefore there is no difference in the edged cobble morphology based on material type. This indicates that edged cobbles had a standard shape regardless of material type.

Table 8: Results of two sample t-test of metric measurements for FGV and quartzite edged cobbles.

df=68	*p*- value	observed t	Reject H_0
Length	0.162	-1.4	No
Width	0.799	0.255	No
Thickness	0.235	-1.19	No
Weight	0.237	-1.18	No
Edge Angle	0.929	-0.089	No

The results of scatterplots for paired metric measurements width and thickness have the strongest linear relationship with a $R^2=0.1183$. There appears to be no relationship between thickness and edge angle which has a $R^2=0.0008$. Overall there is a very weak linear relationship between the pairings of length and width, length and thickness, length and edge angle, width and edge angle. The strongest relationships are between length and weight and width and weight. Since these relationships are naturally interrelated phenomena based on the shape and weight of the unmodified cobble, I expected these pairings to be higher than the others. However, since all of the pairings have low R^2s, I consider none of them to be statistically significant.

The results of the Coefficient of Determination for pairing of metric measurements (Table 9) show that the strongest linear relationship is for width and weight ($R^2=0.4474$), with thickness and weight ($R^2=0.4294$) and length and weight ($R^2=0.4111$) also having a linear, albeit weak, relationship. This means for these pairings over 40% of the variation in width, thickness, and length can be explained by the variation in their size. The remaining pairings appear to have very weak or no linear relationship. As I stated earlier, I expected these pairings to be the strongest since they are all naturally interconnected occurrences. Since all of the pairings have low R^2s, I consider none of them to be statistically significant.

Table 9: Results of the Coefficient of Determination for pairing of metric measurements.

Metric Measurement Pairing	R^2	R^2 strength
Length x Width	0.0474	very weak
Length x Thickness	0.0419	none
Length x Weight	0.4111	weak
Length x Edge Angle	0.0027	none
Width x Thickness	0.1183	very weak
Width x Weight	0.4474	weak
Width x Edge Angle	0.0027	none
Thickness x Weight	0.4294	weak

Edge Types

The most visible part of an edged cobble is the worked edge. For my analysis, I compared worked edges of the Cherry Point edged cobble assemblage to the worked edges of my replicated cobbles, calculated material types and edge damage types, and tested to see if the edged cobble morphology varied by edge damage type. The edge type categories I defined based on my experimental work with the replicated cobbles were battered edged cobbles (used on stone), blunted edged cobbles (used on wood), and sharp edged cobbles (resharpened or newly created).

Of the 337 edged cobbles, I was able to determine the type of edge damage for 332 of them. I was unable to determine edge damage type on five edged cobbles due to weathering (

Table 10).

Table 10: Edge damage counts by material type.

Material	Battered	Blunt	Sharp	Unknown edge damage
FGV	33	13	23	0
Granite and other coarse-grained materials	1	1	1	0
Metasediment	2	0	1	0
Quartzite	110	44	101	5
Sandstone	0	0	1	0
Serpentine	1	0	0	0

My analysis of the worked edge damage revealed that 147 of the edged cobbles have battered worked edges, 58 have blunted worked edges, and 127 have sharp worked edges (Table 11).

Table 11: Edge damage counts.

	N	%
Battered	147	44
Blunted	58	17
Sharp	127	38
N/A	5	1
Total	337	100

One of my hypotheses was that edged cobbles with battered edges would comprise more than 50% of the Cherry Point edged cobble assemble, but they only comprised 44% of the edged cobble assemblage. In other words, nearly half of the edged cobbles at the site were last used to modify stone. What I did not expect was the high percentage (38%) of sharp edged cobbles. This high percentage could suggest that Cherry Point occupants were maintaining and possibly storing this tool type for future use, which goes against the general assumption of edged cobbles being non-curated, expedient tools. I did expect the blunted edged cobbles to be in the minority. At first glance, this would suggest that edged cobbles were not primarily used for wood-working activities.

Quartzite edged cobbles with battered edges are the most frequent, making up 42% of the quartzite edged cobble collection, while sharp edges make up approximately 39% and blunted edges make up about 17%. Unexpectedly, sharp edged cobbles are also well-represented. The FGV edged cobbles percentages by edged damage types closely mirror the quartzite edged cobble collection. This observation suggests that there was no preference for material type for an edged cobble that would be used to modify stone or chop wood.

On average, blunted edged cobbles are longer, wider, and weigh more than battered and sharp edged cobbles (Table 12, Table 13, and Table 14). One possible reason that they are longer is that they are used on wood and don't break down as quickly, which in turn requires less maintenance.

Table 12: Length (cm) mean and standard deviation (SD) for Cherry Point edged cobbles by damage type.

Length (cm)	n	Mean	SD
Battered	147	8.4	1.6
Blunted	58	9.2	2.3
Sharp	127	8.8	2.5

Table 13: Width (cm) mean and standard deviation (SD) for Cherry Point edged cobbles by damage type.

Width (cm)	n	Mean	SD
Battered	147	9.0	1.9
Blunt	58	9.4	2.1
Sharp	127	9.0	2.0

Table 14: Weight (g) mean and standard deviation (SD) for Cherry Point edged cobbles by damage type.

Weight (g)	n	Mean	SD
Battered	147	551.9	237.9
Blunt	58	584.0	329.2
Sharp	127	535.1	363.7

On average, battered edged cobbles have a steeper edge angle than blunted and sharp edged cobbles (Table 15). The steeper edge angle is probably due to the amount of damage the worked edge takes when used on stone, which shortens the worked edge and steepens the edge angle. Another possible reason is that if an edged cobble was used on stone and the user resharpened it, then the edge would also be steeper.

Table 15: Edge Angle (°) mean and standard deviation (SD) for Cherry Point edged cobbles by damage type.

Edge Angle (°)	n	Mean	SD
Battered	147	69	14.5
Blunt	58	63	12.6
Sharp	127	59	16.4

I conducted one-way ANOVA tests of the metric measurements in order to determine if there were any differences in edged cobble morphology based on edge damage type (Table 16). The test results showed there are statistically significant differences in the mean lengths and widths of battered, blunted, and sharp edged cobbles. The results also showed that there are no statistically significant difference between the mean thicknesses, weight, and edge angles of battered, blunted, and sharp edged cobbles.

Table 16: Results of One-way ANOVA test of metric measurements.

One-way ANOVA	Sum of Squares	df	Mean Square	F	*p*-value
Length	27.519	2	13.759	3.125	0.045
Width	49.878	2	24.939	7.458	0.001
Thickness	7.38	2	3.69	2.491	0.084
Weight	95246.3	2	47623.2	0.504	0.605
Edge Angle	489.092	2	244.546	1.028	0.359

Since the one-way ANOVA test does not tell me which pairings are significantly different, I conducted a Tukey's pairwise comparison of the measurements that shared significant differences (Table 17). The only observed differences that are less the *p* are between the lengths and widths of battered and blunted edged cobbles.

Table 17: Tukey's pairwise comparison of length and width measurements with observed differences listed.

Length (*p*=*0.045*)	Battered	Blunted	Sharp
Battered		**0.03151**	0.3799
Blunted	3.564		0.4576
Sharp	1.877	1.686	

Width (*p*=*0.001*)	Battered	Blunted	Sharp
Battered		**0.000744**	0.0447
Blunted	5.179		0.4096
Sharp	3.377	1.803	

The results of this analysis show that battered edged cobbles do have significant differences in mean measurements when compared to blunted edged cobbles. When the metric measurement means of battered edged cobbles are compared to those of blunted edged cobbles, there is a statistically significant difference between the mean lengths and widths compared to blunted edged cobbles. Battered edge cobbles are shorter and narrower than blunted edge cobbles. These differences could be attributed to being used on stone with subsequent resharpening episodes. Much more damage occurs to worked edged used to modify stone than the damage to a worked edged used to chop wood and would require more frequent resharpening.

Resharpening Episodes

The results of the one-way ANOVA and Tukey's pairwise comparison for length indicate that battered edged cobbles are shorter than sharp and blunted edged cobbles. I consider this to be a result of battered edged cobbles taking on more damage since they were used to modify stone. I compared the Cherry Point edged cobble assemblage to my resharpened replicated edged cobbles to ascertain if, and how many, of the archaeological samples had been resharpened. The results of my comparison show that 91% of the edged cobbles were resharpened (Figure 24). This is consistent with the resharpened edge cobbles by material type (Table 18). The battered edged cobbles had the highest percentage of resharpened cobbles at 95% and sharp edged cobbles had the lowest at 87% (Figure 24; Table 19).

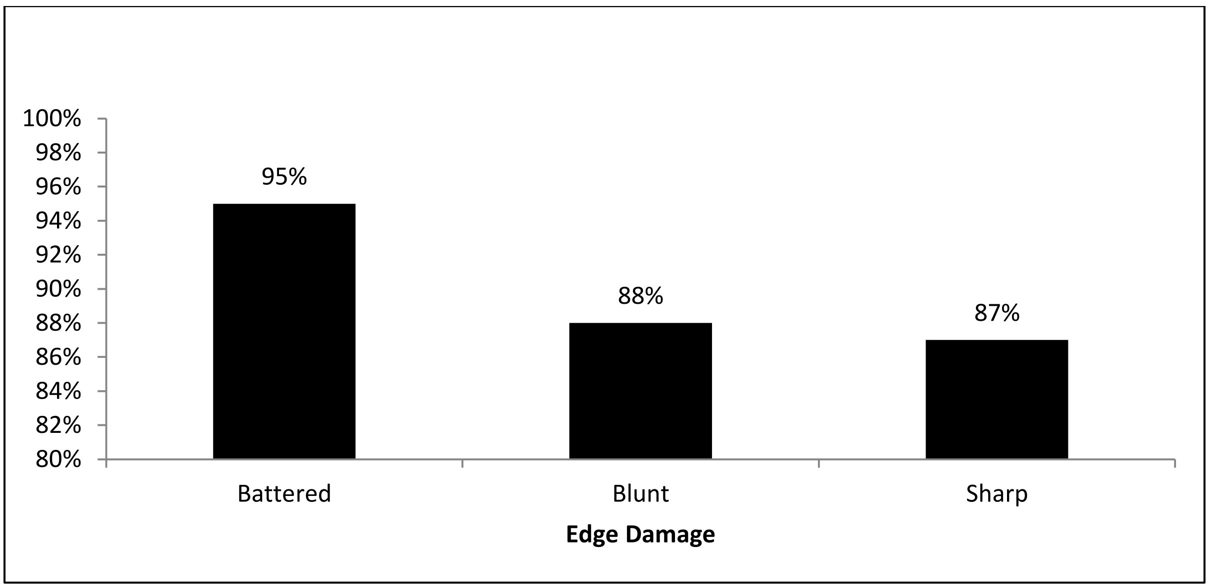

Figure 24: Percentage of edged cobbles that were resharpened at least once.

Table 18: Count of resharpened and not resharpened edged cobble by material type.

Counts		Material Types					
		FGV	Granite and other coarse-grained materials	Metasediment	Quartzite	Sandstone	Serpentine
	Not Resharpened	5 (7.2%)	--- (0%)	1 (20%)	23 (8.8%)	1 (100%)	--- (0%)
	Resharpened	64 (92.8%)	3 (100%)	2 (40%)	237 (91.2%)	--- (0%)	1 (100%)
	Total	**69**	**3**	**5**	**260**	**1**	**1**

Table 19: Count of resharpened and not resharpened edged cobble by edge damage type.

Counts		Edge Damage Types		
		Battered	Blunted	Sharp
	Not Sharpened	7 (4.8%)	7 (12.1%)	16 (59.3%)
	Resharpened	140 (95.2%)	51 (87.9%)	11 (40.7%)
	Total	**147**	**58**	**27**

The results of my analysis show that despite material type and edge damage type, the majority of the Cherry Point edged cobbles were resharpened. This indicates the occupants at Cherry Point were maintaining edged cobbles.

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Spatial Distribution of edged cobbles at Cherry Point

Of the 337 edged cobbles, 330 were recovered from 48 of the 72 cuts at various depths, 2 edged cobbles are located in Cut A and Cut AA whose locations are unclear, 1 edged cobble was found a in spoil pile and 4 edged cobbles have no provenience. The northwest area of Cherry Point is where approximately 57% (n=187) of the edged cobbles were located. This area also contained approximately 45% (n=84) of the stone weights.

During my initial analysis of Cherry Point, I noticed that many of the edged cobbles were found in the same units as stone weights (Table 20). I also counted the number of edged cobbles by edge damage type for excavation units that had at least one stone weight. I did not account for volume. The results showed that Excavation Unit S4E1 had the highest count of edged cobbles (n=53), the highest count of battered edged cobbles (n=32), and had 10 stone weights. Excavation unit N4W9 had the second highest total of edged cobbles (n=47), the second highest count of battered edged cobbles (n=31), and the highest count of stone weights (n=21). Across the site, stone weights are found in 25 excavation units at various depths. Sharp edged cobbles are found in 92% of those units, battered edged cobbles are found in 68% of the units, and blunted edged cobbles are found in 56% of the units (Table 20). This result is not unexpected due to the differences in sample sizes for the three edged cobble types.

Table 20: Stone weight and edged cobble counts by edge damage in excavation units.

Unit	Stone Weight	Battered Edged Cobbles	Blunted Edged Cobbles	Sharp Edged Cobbles
N03W04	2	1	1	3
N03W09	3	2	1	2
N03W11	2	6	2	7
N04W09	21	31	5	11
S01W04	4	1	0	2
S01W08	1	0	0	1
S01W10	2	2	2	2
S02E01	4	1	1	3
S02W06	2	0	0	1
S03E01	15	8	1	3
S03W04	5	1	0	1
S03W06	8	1	0	0
S03W07	3	1	1	3
S04E01	9	32	12	9
S04W04	3	13	4	9
S07E08	11	0	0	1
S07E09	1	2	0	6
S08E08	3	1	0	1
S09E19	5	9	4	2
S10E13	12	0	0	4
S16E17	1	0	1	1
S20E29	1	0	1	1
S21E29	2	2	1	10
S23E29	3	0	0	1
S24E29	10	0	0	0

Spatial analysis consisted of first visually inspecting site map for areas with high counts of edged cobbles and stone weights by excavation unit (Figure 25 and Figure 26). Then, I determined edge damage types for these same units.

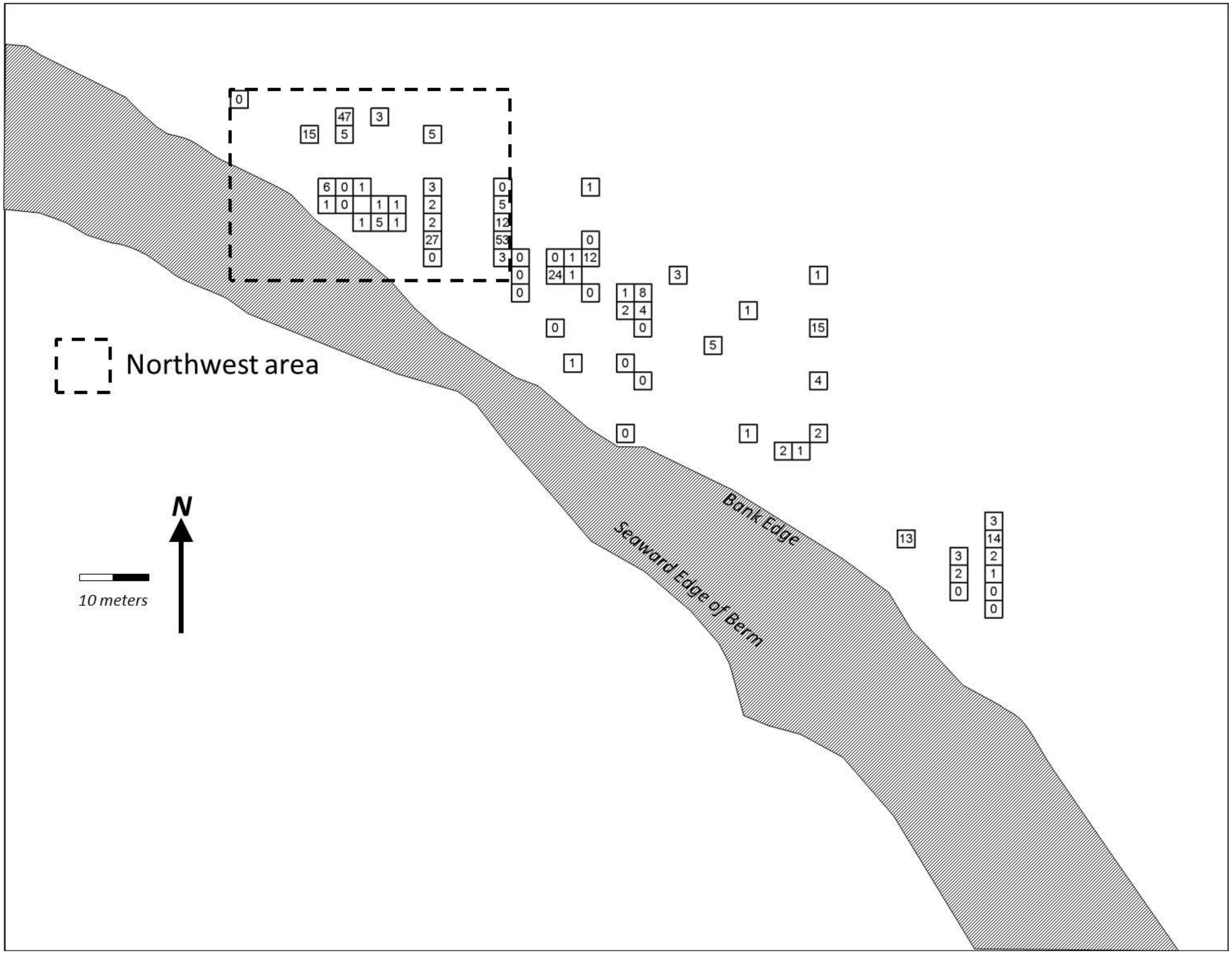

Figure 25: Distribution of edged cobbles (n=330) by excavation units. Excavation units are generally 2 meters x 2 meters.

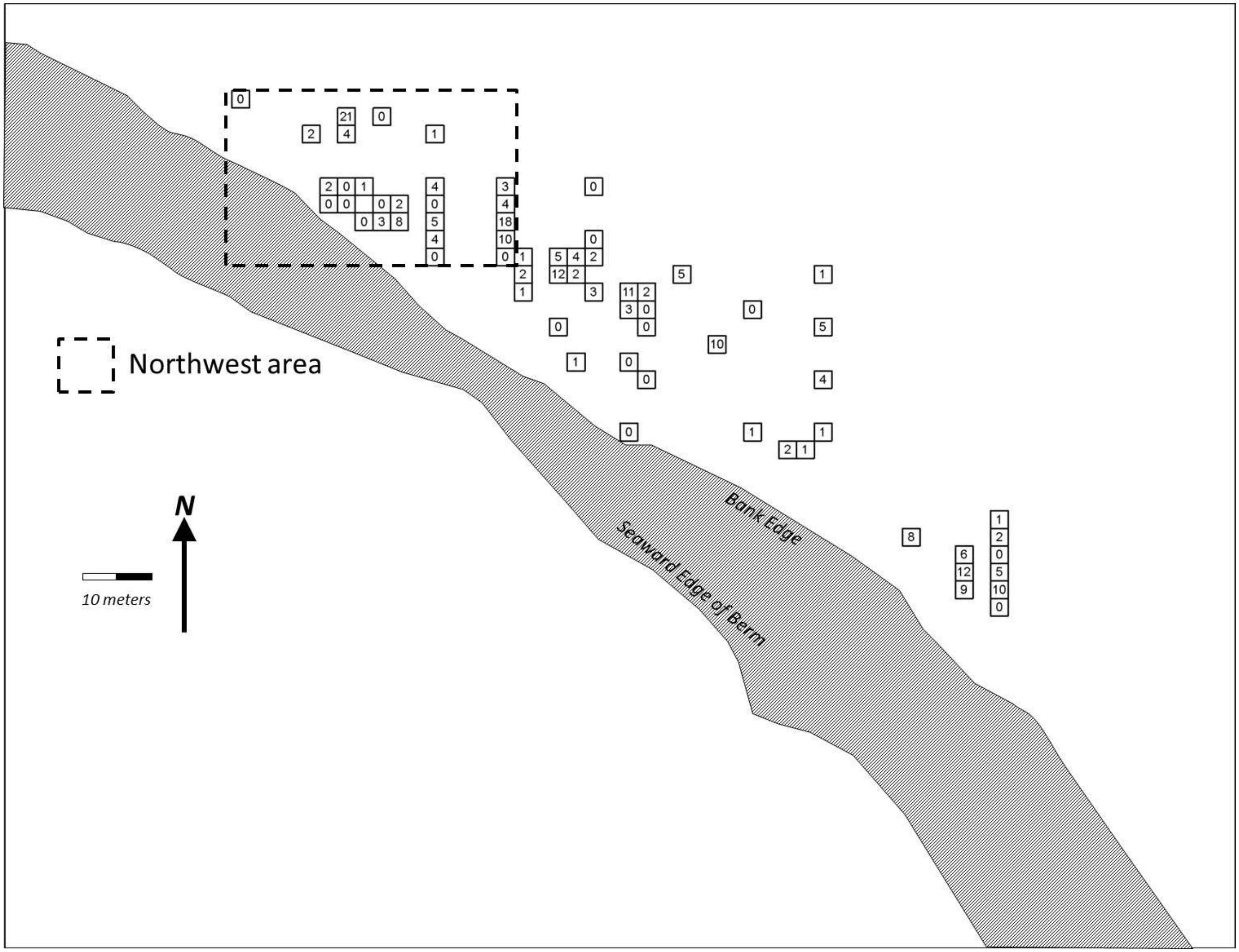

Figure 26: Distribution of stone weight count (n=148) by excavation unit. Excavation units are generally 2 meters x 2 meters.

I wanted to verify that edged cobbles were in fact associated with stone weights so I conducted chi-square tests for each edged cobble type and stone weights. I conducted a series of chi-squares testing the strength of locational association with stone weights and edged cobbles and stone weights and edge damage types (see Table 21 for an example). At 0.05, all pairings rejected the null hypothesis that stone weights and edged cobbles are independent of each other (Table 22).

Table 21: Frequency of stone weights and battered edged cobbles and results of Chi-Squared test.

	Observed Values		Expected Values	
	Stone Weight: Present	Stone Weight: Absent	Stone Weight: Present	Stone Weight: Absent
Battered Edged Cobble: Present	27	3	19.58	10.42
Battered Edged Cobble: Absent	20	22	27.42	14.58

H_0: Edged Cobbles with battered worked edges and Stone Weights are independent.			
X^2 Observed	X^2 Critical (0.05, df=1)	*p*-value	Reject H_0
13.87	3.84	<0.000	Yes

Table 22: Results of chi-square for stone weight and edged cobble pairings.

Pairing	X^2 Observed	*p*-value	Reject H_0
Stone Weight and Edge Cobble	16.2	<0.000	Yes
Stone Weight and Battered Edge Cobble	13.87	<0.000	Yes
Stone Weight and Blunt Edged Cobble	4.31	0.038	Yes
Stone Weight and Sharp Edged Cobble	12.55	<0.000	Yes

I decided to use the Yule's Q coefficient to determine the strength of association between stone weight and edged cobbles because I had a 2x2 table that displayed the presence and absence of these artifacts by excavation unit. Using the Yule's Q coefficient, I show that battered edged cobbles and stone weights have the strongest association (Table 23).

Table 23: Results of Yules Q for stone weight and edged cobble pairings.

Pairing	Yules Q	Strength of Association
Stone Weight and Edged Cobble	0.79	Very Strong Association
Stone Weight and Battered Edged Cobble	0.82	Very Strong Association
Stone Weight and Blunt Edged Cobble	0.53	Moderate Association
Stone Weight and Sharp Edged Cobble	0.75	Very Strong Association

The very strong association between the pairings of Stone Weight and Battered Edged Cobble and Stone Weight and Sharp Edged Cobble suggests there were workspaces dedicated to stone weight manufacturing. Spatial association with edged cobbles is only one indicator that these areas are possible stone weight workshops. To my knowledge, no experimental work has been conducted to replicate a stone weight using lithic tools commonly found in Locarno Beach and Marpole cultural phases. More experimental archaeology is needed in order to determine what other tools were needed in the production of stone weights.

Temporal Distribution of edged cobbles at Cherry Point

The last question I wanted to answer was if battered edged cobbles were found in higher frequency in post-Locarno Beach deposits than in Locarno Beach deposits. To answer this question, I created two temporal analytical units: 1.) Locarno Beach, which consists of the Charles and Locarno Beach cultural phases (4500-2400 BP) and 2.) post-Locarno Beach that consists of the Marpole, Strait of Georgia, and Historic cultural phases (2400-0 BP) (Table 24). I used the 20 radiocarbon dates (See Appendix A) obtained from 17 excavation units to determine which analytical units were present. Using Dubeau's approach (Dubeau 2012:53-54), I was able to expand the total number of excavation units which had either or both AUs to 26.

Table 24: Cultural phases in each analytical units.

Analytical Unit	Cultural Phase	Date Range (BP)
Locarno Beach	Charles	4500-3200
	Locarno Beach	3200-2400
post-Locarno Beach	Marpole	2400-1600
	Strait of Georgia	1600-200
	Historic	200-0

Overall, I was able to place 200 edged cobbles and 102 stone weights into one of AUs (Table 25). The Locarno Beach AU had 170 edged cobbles. The edged cobble assemblage consisted of 80 battered edges, 25 blunted edges, 62 sharp edges, and 3 edges I was unable to determine damage due to weathering. In addition to these edged cobbles, 70 stone weights in various stages of production were noted. The post-Locarno Beach AU had 30 edged cobbles. The edged cobble assemblage consisted of 13 battered edges, 10 blunted edges, and 7 sharp edges. In addition to these edged cobbles, 32 stone weights were noted.

Table 25: Edged cobble (by damage type) and stone weight counts per AU.

	Locarno Beach AU	post-Locarno Beach AU
Artifact	Count	Count
Battered edged cobble	80	13
Blunted edged cobble	25	10
Sharp edged cobble	62	7
Unable to determine edge damage	3	0
Stone weight	70	32

There is an obvious decrease in the number of edged cobbles and stone weights from the Locarno Beach AU to the post-Locarno Beach AU. Although the numbers are greatly different, the percentages of edge damage types are somewhat consistent. When looking from the Locarno Beach AU to the post-Locarno Beach AU, battered edged cobbles drop from 47% to 44%, blunted edged cobbles increase from 15% to 33%, and sharp edged cobbles drop from 36% to 23%. This could reflect a change in activities at Cherry Point. For example, in the Locarno Beach AU, edged cobbles were used more to modify stone and less for wood-working activities, but in the post-Locarno Beach AU the roles were reversed.

I repeated the same series of chi-squares as in the spatial section, testing the strength of locational association between stone weights and edged cobbles and stone weights and edge damage types by temporal analytical unit (Table 26). In the Locarno Beach AU, at 0.05 none of the only pairings rejected the null hypothesis.

Table 26: Results of chi-square for stone weight and edged cobble pairings in the Locarno Beach AU.

Locarno Beach AU: Pairing	X^2 Observed	*p*-value	Reject H_0?
Stone Weight and Battered Edge Cobble	0.07	0.787	No
Stone Weight and Blunted Edged Cobble	0.22	0.639	No
Stone Weight and Sharp Edged Cobble	0.01	0.919	No

In the post-Locarno Beach AU, at 0.05 the only pairing that did reject the null hypothesis is stone weight and battered edged cobble (Table 27).

Table 27: Results of chi-square for stone weight and edged cobble pairings in the post-Locarno Beach AU.

post-Locarno Beach AU: Pairing	X^2 Observed	*p*-value	Reject H_0?
Stone Weight and Battered Edge Cobble	4.00	0.046	Yes
Stone Weight and Blunted Edged Cobble	0.23	0.629	No
Stone Weight and Sharp Edged Cobble	1.13	0.289	No

I used the Yule's Q coefficient to determine the strength of association between the stone weight and edged cobble pairings that rejected the null hypothesis. The results (Table 28) showed that the pairing of stone weight and battered edged cobble had a perfect positive association. This suggests that there were workspaces dedicated to stone weight manufacturing.

Table 28: Results of Yules Q for stone weight and edged cobble pairings in the post-Locarno Beach AU.

post-Locarno Beach AU: Pairing	Yules Q	Strength of Association
Stone Weight and Battered Edged Cobble	1	Perfect Positive Association

Summary

The Cherry Point edged cobble assemblage shows there is a difference in tool morphology related to the type of edge damage. Battered edged cobbles are shorter and narrower than blunted edged cobbles and battered edged cobbles are also shorter than sharp edged cobbles. The majority of the edged cobbles are composed of quartzite which is probably due to flakability and durability, or perhaps it is easily procured from the adjacent cobble beach. All edged types were present and there is no association between material type and edge damage type. Over 90% of the edged cobbles were resharpened at least once, proving that this tool was maintained. All edge types were found across the site, but certain areas have a higher concentration of battered and sharp edged cobbles strongly associated with stone weights. These areas are possible stone weight manufacturing work spaces. Finally, all edge damage types are present in both AUs, but lower counts of battered edged cobbles are found in the post-Locarno Beach AU. Interestingly, there are more stone weights in the post-Locarno Beach AU. This could reflect that a new tool was used to manufacture stone weights in the post-Locarno Beach cultural phases.

CHAPTER 5: DISCUSSION AND CONCLUSIONS

As scientists, archaeologists sometimes accept interpretations proposed long ago as the standard. An example of this is that in the Salish Sea, edged cobbles were best suited for tasks that required heavy duty chopping, primarily for wood-working or disarticulation of animal carcasses. In my thesis, I questioned this standard and investigated if the Cherry Point edged cobbles had another use: to manufacture stone weights. This hypothesis of using edged cobbles to modify stone was brought forward by three earlier researchers, but it was never tested. Previous research of edged cobbles by archaeologists focused on worked edge shape, worked edge location, and use-wear. The typologies created for these analyses were excessive and did not offer an alternative to the consensus hypothesis that edged cobbles were the primary wood-working tool during the Locarno Beach phase. Further they did not use replication as an aid to recognizing relevant use-wear attributes.

During the course of my analysis, I tested to determine if edged cobbles had a standard morphology by material type or edge damage type. I also tested to determine if edged cobbles were maintained via resharpening of the worked edge. Finally, I wanted to ascertain if edged cobbles were spatially and temporally associated with stone weights. My research has shown that the Cherry Point edged cobbles were in fact used to also modify stone and there is a strong likelihood they were used in the manufacture of stone weights. This alternative explanation may shed some light on why this tool persists in cultural phases after the introduction of other tools better suited for wood-working and carcass disarticulation. This simple tool is actually part of a sophisticated response to contingencies during the Locarno Beach-to-Marpole transition in the Salish Sea. In designing the edged cobbles, the occupants at Cherry Point had to weigh numerous variables and thus making these tools products of a larger process of conscientious decision-making related to short and long term survival.

Did the Cherry Point edged cobbles have a standard shape or do they vary morphologically? The results of my analyses for tool morphology indicated that the Cherry Point edged cobbles have a standardized shape while weight varied slightly. There was no difference in the edged cobble morphology based on material type. Also, there were significant differences in mean lengths and widths between battered edged cobbles and blunted edged cobbles. This indicates that there is a difference in tool morphology based on edge damage type. Overall, battered edged cobbles have a steeper edge angle than blunted and sharp edged cobbles. The steeper edge angle could be a result of the damage the worked edge takes when used on stone or from a resharpening episode. I interpret these results as indication that battered edged cobbles have a different morphology than blunted and sharp edged cobbles. The fact that battered edged cobbles are narrower than the other two types could be a matter of preference during the selection process. This suggests the occupants made these tools to certain specifications and were deliberate in their unmodified cobble selection.

The results of my experimental archaeology demonstrated that there were three distinct edge types: battered (used on stone), blunted (used on wood), and sharp (newly created or resharpened). My experiments showed that the worked edge of an edged cobble used on stone looks significantly different than the worked edged of an edged cobble used on wood. This difference can be discerned with the naked eye and by touch. I also determined that an unused edged cobble or a resharpened unused edged cobble has a worked edge that is different than an edged cobble used on stone or wood. I compared these worked edges to the

Cherry Point edged cobbles and determined that battered edges were found on 44% of the edged cobbles. If this comparison is valid, then nearly half of the edged cobbles were last used to modify stone.

I also compared the Cherry Point edged cobble assemblage to my resharpened replicated edged cobbles and the results of my comparison show that 91% of the edged cobbles were resharpened. The battered edged cobbles had the highest percentage of resharpened cobbles. I also noted that sharp edged cobbles comprised approximately 37% of the edged cobble assemblage. This result raised an unexpected question: why are there so many sharp edged cobbles? If edged cobbles were used and then discarded, I would expect to see more battered and blunted. I interpret the high percentage of sharp edged cobbles to indicate the Cherry Point occupants were maintaining this tool through resharpening and storing it for future use.

The Cherry Point edged cobble assemblage shows difference in tool morphology based on edge damage type. The majority of the edged cobbles are composed of quartzite which is probably due to flakability and durability, or perhaps it is easily procured from the adjacent cobble beach. All edged types were present and there is no association between material type and edge damage type. Over 90% of the edged cobbles were resharpened at least once, showing that this tool was maintained.

All edged types were found across the site, but certain areas have a higher concentration of battered and sharp edged cobbles strongly associated with stone weights. These areas are possible stone weight manufacturing work spaces. Spatially, the paired variables stone weight and battered edged cobbles and stone weight and sharp edged cobbles had the strongest associations. I conducted density analyses for stone weights and each edge damage type and the results indicated that the combination stone weights and battered edged cobbles has the densest concentrations in the northwest area of the site, while the other two combinations are more evenly dispersed across the site. This suggests that there were workspaces dedicated to stone weight manufacturing.

I was only able to determine the temporal analytical unit for 200 edged cobbles and 102 stone weights. Approximately 85% of the edged cobbles were located in the Locarno Beach AU and approximately 45% of the stone weights were located in the post-Locarno Beach AU. All edge damage types are present in both AUs, but lower counts in post-Locarno Beach AU.

I also tested the strength of spatial association with stone weights and each edge damage types by temporal analytical unit. In the Locarno Beach AU, the results showed that there were no associations with the pairings. In the post-Locarno Beach AU, the results showed that the pairing of stone weight and battered edged cobble had a perfect positive association. This suggests that in each post-Locarno Beach AU there were workspaces dedicated to stone weight manufacturing.

Future research could further explore if edged cobbles experienced a change in use during the Locarno Beach-to-Marpole transition and perhaps by looking at other large stone artifacts that were partially shaped by pecking. It is possible that with the introduction of adze blades as the primary wood-working tool during the Marpole phase, the role of edged cobbles became more specialized and was only used to modify stone. This change from a general to a specialized use may also be a reflection of the change in social complexity during this time.

Future replicative work could address a wider range of stone materials including harder materials such as vesicular basalt that would more realistically replicate the materials of choice in stone weights, bowls, and sculptures. In retrospect, the sandstone I chose was not well-cemented and transverse breaks were common during my perforation attempts with a quartzite edged cobble. One avenue of future research would be to manufacture a perforated stone weight using an edged cobble as part of the tool kit. Another future research project would be to compare the edge damage of an edged cobble used to disarticulate a carcass to the edge damages in this thesis.

Cherry Point has the potential to add much needed data about Locarno Beach cultural phase in the Salish Sea. With a small number of Locarno Beach aged sites (approximately 30) in this area, any new data is helpful. My detailed analysis of the edged cobbles provided information about the behaviors of the occupants of Cherry Point, in particular behavior relating to fishing gear. No one doubts the importance of fishing in the prehistoric Salish Sea and stone weights are a part of nearly every single fishing gear. But no one has thoroughly examined how the stone weights are produced.

Using design theory, experimental archaeology, and use-wear analysis, I identified that the users of the Cherry Point edged cobbles are not constrained by the physical properties of the raw material because of the abundance of cobbles to choose from to make an edged cobble. The time they invested in selecting the proper cobble to make an edged cobble was valuable. They are not constrained by the functional efficiency of this tool type because its high functional efficiency is demonstrated by its continued use over time. The inhabitants of Cherry Point showed efficiency in selecting a location that allowed them to take advantage of the cobble beach that is rare in this area. The consequences of failure are low in the creation of an edged cobble if the correct cobble is selected. With each resharpeneing episode, the risk of failure increases due to imperfections in the material or if the user incorrectly strikes the stone. Overall, the risk of failure is low in looking only at the manufacture and use of edged cobbles themselves, but if one looks at the bigger picture the risk of failure become higher when they are used to create a perforated weight. As my replicative experiment showed, using an edged cobble on inappropriate material will break the very thing you are trying to make. The maintainability of this is tool is limited because it can only be sharpened a limited number of times before the edge angle becomes too steep. However, the fact that this tool can be resharpened and at Cherry Point sharp edged cobbles were cached, shows that the time spent selecting the unmodified cobbles was valuable.

Archaeologists have learned there is considerably more to past cultures than the lives of elites found in their palaces and tombs. They have turned more and more to the homes and activities of the ordinary or lower class people. I have attempted something similar by demonstrating the value of the information which can be gleaned from a less glamorous or diagnostic tool type. I have shown decisions and choices were made by individuals as they organized their activities and addressed their needs. I have demonstrated through replicative experimentation and statistics that the Cherry Point occupants not only used edged cobbles for wood-working activities but to modify stone, in particular stone weights. Once a major focus of archaeological analysis, edged cobbles are rarely discussed in the current literature. I have shown that by taking a fresh look at this old artifact, archaeologists can discover something new about the lives of the prehistoric peoples of not only at Cherry Point, but at other sites in the Pacific Northwest.

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Appendix A: Radiocarbon Dates

WWU #, Reference, Lab #	$^{14}C \pm \sigma$ Yrs BP $\delta^{13}C$-corrected	Cal BP Yrs $\pm 2\sigma$ Cal BC/AD Yrs $\pm 2\sigma$	Analytical Unit
633, (Blodgett 1975; Reimer et al. 2009), Not Assigned	2340 ± 200	BC 849 to AD 60 AND BC 894 to 873	Locarno Beach
1149, (Blodgett 1975; Reimer et al. 2009), Not Assigned	1300 ± 200	AD 343 to 1159	post-Locarno Beach
1250, (Blodgett 1975; Reimer et al. 2009), Not Assigned	1640 ± 200	BC 56 to AD 780	post-Locarno Beach
1597, (Blodgett 1975; Reimer et al. 2009), RL272	2630 ± 240	BC 1389 to 336 AND BC 331 to 203	post-Locarno Beach
45WH1S8E880100, (Campbell 2011), Beta-298339	1280 ± 40	BP 550 to 410 AD 1400 to 1540	post-Locarno Beach
WH1S21E294060cm, (Dubeau 2012), Beta-294108	90 ± 30	BP 270 to 210 AND BP 140 to 20 AND BP 0 to 0 AD 1680 to 1740 AND AD 1810 to 1930 AND AD 1950 to 1960	post-Locarno Beach
WH1S21E2980100cm, (Dubeau 2012), Beta-294109	1140 ± 30	BP 1140 to 970 AD 810 to 980	post-Locarno Beach
WH1S10E1380100cm, (Leick 2012), Beta-307547	3360 ± 30	BP 2830 to 2450 BC 880 to 500	Locarno Beach
45WH1N3W936cm, (Palmer 2012), Beta-292828	2420 ± 30	BP 2690 to 2640 AND BP 2610 to 2590 AND BP 2500 to 2350 BC 740 to 690 AND BC 660 to 640 AND BC 550 to 400	Locarno Beach
45WH1S24E2970cm, (Palmer 2012), Beta-292829	1230 ± 40	BP 1270 to 1060 AD 680 to 890	post-Locarno Beach
45WH1 S1W10 80-100, (Rorabaugh 2010), UGAMS-04047	3340 ± 30	BC 873 to 547	Locarno Beach

45WH1 S1W10 60-80, (Rorabaugh 2010), UGAMS-03342	1470 ± 25	AD 1225 to 1418	post-Locarno Beach
45WH1 S22E27 60-80, (Rorabaugh 2014), D-AMS-003682	1127 ± 20	BP 724 to 639 AD 1226-1311	post-Locarno Beach
45WH1 S9E4 20-40, (Rorabaugh 2014), D-AMS-003683	1136 ± 22	BP 734 to 641 AD 1216 to 1309	post-Locarno Beach
45WH1 S24E27 120-140 (Rorabaugh 2014), D-AMS-003681	2050 ± 25	BP 1275 to 1155 AD 674 to 795	post-Locarno Beach
45WH1 S11E5 40-60 (Rorabaugh 2014), D-AMS-003684	3461 ± 25	BP 2438 to 2291 BC 489 to 342	Locarno Beach
45WH1S4E150c, (Taber 2010), Beta-279605	3570 ± 50	BP 3150 to 2720 BC 1200 to 770	Locarno Beach
45WH1S4W450c, (Taber 2010), Beta-279606	3710 ± 60	BP 3330 to 2840 BC 1380 to 890	Locarno Beach
45WH1S16E174060, (Todd 201X), Beta-299323	3260 ± 50	BP 2750 to 2320 BC 800 to 370	Locarno Beach
45WH1S16E1780100, (Todd 201X), Beta-299324	3240 ± 30	BP 2730 to 2320 BC 780 to 370	Locarno Beach

Appendix B: Edged Cobble Raw Data

Artifact #	Cut	Unit	Level	Depth (cm)	N/S of 0	E/W of 0	AU	Length (cm)	Width (cm)	Thickness (cm)	Weight (g)	Edge Damage	Edge Angle (°)	Resharp?	Material
3797	A						Unknown	7.70	11.21	4.26	449.15	Sharp	26	N	quartzite
3760	AA	6	40-60	45	N 0.40-0.47	E 0.90-0.94	Unknown	7.73	11.08	5.10	604.42	Sharp	61	Y	quartzite
1131	N/A						Unknown	7.16	8.82	4.71	524.24	Blunted	44	Y	quartzite
4344	N/A						Unknown	8.97	6.44	2.54	230.64	Sharp	60	Y	quartzite
4351	N/A						Unknown	10.34	6.58	4.01	442.44	Sharp	59	Y	granite
4376	N/A						Unknown	5.98	9.26	2.43	218.04	Blunted	74	Y	quartzite
1001	N03W04	B	40-60	49	N 8.05	W 10.60	Locarno Beach	8.18	7.47	3.49	264.67	Battered	76	Y	quartzite
1021	N03W04	B	40-60	55	N 8.17	W 10.45	Locarno Beach	6.96	10.30	3.73	356.14	Sharp	84	Y	quartzite
1045	N03W04	G	60-80	62	N 6.80	W 11.30	Locarno Beach	10.12	7.40	5.17	517.66	Blunted	82	Y	fgv
1046	N03W04	G	60-80	66	N 6.70	W 11.65	Locarno Beach	8.38	7.63	2.87	271.98	Sharp	57	Y	quartzite
1134	N03W04	F	40-60	63	N 7.20	W 9.80	Locarno Beach	9.40	8.47	5.72	838.92	Battered	76	Y	quartzite
621	N03W09		60-80				Locarno Beach	9.06	6.84	4.64	497.52	Battered	49	Y	quartzite
622	N03W09		60-80				Locarno Beach	12.74	7.61	4.66	820.89	Sharp	83	Y	fgv
624	N03W09	D	60-80	65	N 7.20	W 26.40	Locarno Beach	7.68	8.48	5.41	426.38	Battered	65	Y	quartzite
628	N03W09	C	60-80	80	N 8.30	W 24.00-25.00	Locarno Beach	8.84	11.78	4.81	849.11	Battered	57	Y	quartzite
631	N03W09	C	60-80	80	N 7.50	W 24.00-25.00	Locarno Beach	6.95	10.27	4.72	447.52	Sharp	66	Y	quartzite
740	N03W11	B	20-40	27	N 8.24	W 31.1	Unknown	11.40	9.35	5.84	803.51	Battered	65	Y	quartzite
841	N03W11						Unknown	9.14	6.36	1.76	205.89	Blunted	67	Y	fgv
942	N03W11						Unknown	8.17	6.09	3.67	246.15	Battered	80	Y	fgv
989	N03W11	B	80-100	80	N 8.50	W 31.45	Locarno Beach	7.54	6.53	3.59	226.36	Sharp	47	Y	quartzite
1051	N03W11						Unknown	6.11	9.42	5.60	394.22	Blunted	56	Y	quartzite
1065	N03W11	E	80-100	96	N 7.37	W 31.51	Locarno Beach	7.48	11.93	7.11	815.24	Sharp	62	Y	quartzite
1067	N03W11	F	80-100	98	N 7.40	W 30.63	Locarno Beach	6.93	10.89	6.31	396.18	Sharp	74	Y	quartzite
1069	N03W11	F	80-100	94	N 7.75	W 30.69	Locarno Beach	6.83	8.46	3.29	301.41	Battered	36	Y	fgv
1093	N03W11						Unknown	7.18	11.05	3.57	410.93	Battered	68	Y	fgv
1094	N03W11						Unknown	9.24	9.77	6.02	953.01	Sharp	78	Y	quartzite
1105	N03W11	H	100-120	107	N 6.80	W 31.60	Locarno Beach	7.01	8.94	4.88	441.45	Sharp	37	Y	quartzite
1127	N03W11						Unknown	11.30	8.99	5.72	861.27	Battered	76	Y	quartzite
1139	N03W11	E	100-120	109	N 7.57	W 31.40	Locarno Beach	9.49	9.37	6.48	749.45	Sharp	47	Y	quartzite
1147	N03W11						Unknown	6.61	10.02	4.64	514.42	Battered	74	Y	quartzite
1150	N03W11	D	80-100	98	N 7.60	W 32.04	Locarno Beach	8.58	11.49	4.94	678.68	Battered	67	Y	quartzite
167	N04W07	D	40-60	52	N 10.70	W 20.45	Locarno Beach	7.77	9.52	3.39	244.13	Sharp	52	Y	quartzite
170	N04W07	F	50-70	63	N 10.80	W 18.2	Locarno Beach	14.86	12.29	8.41	2696.40	Sharp	57	Y	quartzite
2939	N04W07		70-80				Locarno Beach	7.14	7.56	4.10	292.78	Sharp	66	Y	quartzite
97	N04W09	A	0-20	20	N 11.68	W 26.92	Locarno Beach	20.13	15.64	7.52	2266.50	Sharp	69	Y	quartzite
161	N04W09	C	20-40		N 11.00-12.00	W 24.00-25.00	Locarno Beach	9.97	9.59	2.79	416.86	N/A	90	Y	quartzite
250	N04W09	C	60-80		N 11.00-12.00	W 24.00-25.00	Locarno Beach	12.21	11.75	4.65	920.25	Sharp	76	Y	fgv
260	N04W09	H	60-80	68	N 10.15	W 26.76	Locarno Beach	11.68	7.69	3.43	456.70	Sharp	57	Y	quartzite
262	N04W09	E	60-80	80	N 10.90	W 26.39	Locarno Beach	6.52	7.39	2.67	194.98	Battered	43	Y	quartzite
263	N04W09	H	60-80	77	N 11.05	W 26.10	Locarno Beach	7.64	10.12	3.79	346.58	Sharp	74	Y	quartzite
270	N04W09	H	80-100	80	N 10.15	W 26.10	Locarno Beach	8.76	8.90	5.40	599.26	Sharp	58	Y	quartzite
272	N04W09	D	80-100	85	N 10.50	W 26.33	Locarno Beach	12.28	8.79	4.95	780.98	Sharp	69	Y	quartzite
286	N04W09	C	80-100	95	N 11.50	W 24.92	Locarno Beach	7.54	8.85	3.22	269.86	Battered	47	Y	fgv
287	N04W09	F	80-100	89	N 10.70	W 24.30	Locarno Beach	14.56	9.03	6.64	1126.11	Blunted	74	Y	metasediment

Artifact #	Cut	Unit	Level	Depth (cm)	N/S of 0	E/W of 0	AU	Length (cm)	Width (cm)	Thickness (cm)	Weight (g)	Edge Damage	Edge Angle (°)	Resharp?	Material
288	N04W09	E	80-100	87	N 10.65	W 25.15	Locarno Beach	7.27	6.41	4.72	292.99	Blunted	59	Y	quartzite
318	N04W09	F	100-120	103	N 10.08	W 24.54	Locarno Beach	10.69	7.89	4.43	564.29	Blunted	56	N	quartzite
319	N04W09	I	100-120	103	N 9.83	W 24.61	Locarno Beach	7.14	6.13	3.09	150.80	Sharp	76	Y	quartzite
320	N04W09	H	180-200	190	N 9.79	W 25.12	Locarno Beach	6.62	8.22	3.40	283.46	Battered	76	Y	quartzite
323	N04W09	E	80-100	89	N 10.91	W 25.14	Locarno Beach	10.40	7.42	3.62	414.49	Sharp	79	Y	quartzite
330	N04W09	F	80-100	95	N 10.13	W 24.84	Locarno Beach	10.18	7.01	2.33	234.58	Sharp	66	Y	quartzite
331	N04W09	I	80-100	100	N 9.85	W 24.86	Locarno Beach	6.15	5.66	4.27	237.37	Sharp	74	Y	quartzite
344	N04W09	A	80-100	93	N 9.79	W 25.98	Locarno Beach	9.03	10.22	3.77	420.84	Battered	57	Y	fgv
345	N04W09	H	80-100	95	N 9.60	W 25.42	Locarno Beach	10.51	9.25	4.45	606.31	Blunted	58	Y	quartzite
346	N04W09	B	80-100	91	N 9.98	W 25.80	Locarno Beach	9.35	7.74	4.38	484.66	Blunted	68	Y	quartzite
355	N04W09	E	80-100	100	N 10.20	W 25.05	Locarno Beach	6.94	10.71	5.48	569.09	Battered	77	Y	quartzite
356	N04W09	E	80-100	97	N 10.00	W 25.46	Locarno Beach	7.45	11.90	4.06	620.16	Sharp	46	N	quartzite
360	N04W09	I	100-120	102	N 9.69	W 24.58	Locarno Beach	6.85	10.32	5.65	625.63	Battered	67	Y	quartzite
365	N04W09	B	80-100	98	N 11.03	W 25.34	Locarno Beach	12.50	13.36	5.71	1277.60	Battered	74	Y	quartzite
366	N04W09	A	80-100	92	N 10.74	W 26.40	Locarno Beach	8.98	7.88	5.06	490.94	Battered	46	Y	fgv
368	N04W09	H	80-100	98	N 10.56	W 25.20	Locarno Beach	7.45	10.08	6.81	727.44	Sharp	55	Y	quartzite
369	N04W09	H	80-100	98	N 10.14	W 25.16	Locarno Beach	7.90	8.62	6.54	626.30	Battered	67	Y	quartzite
370	N04W09	H	80-100	95	N 9.93	W 25.46	Locarno Beach	7.12	11.17	5.31	648.18	Battered	71	N	fgv
380	N04W09	D	80-100	98	N 10.54	W 26.66	Locarno Beach	8.61	7.27	3.77	348.45	Battered	81	Y	fgv
381	N04W09	D	100-120	101	N 10.27	W 26.70	Locarno Beach	6.42	9.11	3.86	334.81	Battered	76	Y	quartzite
382	N04W09	D	80-100	100	N 10.00	W 26.62	Locarno Beach	7.91	8.57	3.40	366.90	Sharp	54	N	quartzite
383	N04W09	H	80-100	99	N 9.94	W 25.50	Locarno Beach	7.76	7.03	4.92	411.03	Battered	41	Y	quartzite
390	N04W09	B	80-100	99	N 11.12	W 25.85	Locarno Beach	10.67	7.19	7.18	711.58	Battered	79	Y	fgv
393	N04W09	C	100-120	100	N 11.02	W 24.99	Locarno Beach	7.67	9.25	4.08	426.44	Battered	71	Y	quartzite
394	N04W09						Unknown	9.25	8.00	4.42	430.30	Battered	63	Y	quartzite
395	N04W09	E	100-120	101	N 10.45	W 25.40	Locarno Beach	10.49	7.34	4.18	442.98	Battered	54	Y	quartzite
396	N04W09	D	100-120	103	N 10.20	W 26.49	Locarno Beach	7.06	7.73	7.86	555.72	Battered	83	Y	quartzite
397	N04W09	E	100-120	100	N 10.90	W 25.74	Locarno Beach	7.33	10.53	5.31	584.82	Battered	86	Y	quartzite
399	N04W09	F	80-100	96	N 10.00-11.00	W 24.00-25.00	Locarno Beach	7.35	9.88	5.67	638.72	Battered	63	Y	quartzite
414	N04W09	G	80-100	98	N 9.67	W 26.07	Locarno Beach	9.84	11.40	3.65	551.21	Sharp	84	Y	quartzite
416	N04W09	C	100-120	101	N 11.14	W 24.61	Locarno Beach	9.53	11.04	4.86	659.14	Battered	24	Y	quartzite
420	N04W09	H	100-120	108	N 9.74	W 25.39	Locarno Beach	10.19	6.82	5.21	700.21	Battered	58	Y	quartzite
439	N04W09	A	100-120	106	N 11.03	W 26.48	Locarno Beach	6.70	8.43	5.58	606.04	Battered	78	Y	quartzite
440	N04W09	I	100-120	115	N 9.74	W 24.54	Locarno Beach	6.40	9.05	5.09	411.07	Battered	58	Y	quartzite
490	N04W09	B	100-120	107	N 11.43	W 25.45	Locarno Beach	6.76	9.03	6.55	564.93	Battered	48	Y	quartzite
494	N04W09	I	80-100	90	N 9.67	W 24.31	Locarno Beach	7.08	9.30	5.76	527.89	Blunted	69	Y	quartzite
512	N04W09	D	80-100	98	N 10.53	W 26.88	Locarno Beach	8.13	8.26	5.71	630.18	Battered	43	Y	quartzite
936	S01E06	F	20-40	38.5	S 1.50	E 17.03	Unknown	10.43	12.26	5.56	998.06	Blunted	32	N	quartzite
881	S01W04	H	35-55	43.5	S 2.30	W 10.25	post-Locarno Beach	7.85	8.78	5.75	572.17	Battered	73	Y	quartzite
997	S01W04	H EAST	55-75	55-62	S 2.00-3.00	W 10.00-11.00	Locarno Beach	6.82	9.40	4.65	463.29	Sharp	60	Y	quartzite
1008	S01W04	H	60-80	65-70	S 2.10 +/- 10	W 9.80 +/- 10	Locarno Beach	8.05	9.38	4.44	455.70	Battered	73	Y	fgv
52	S01W08						Unknown	9.64	7.94	4.41	457.39	Battered	39	Y	quartzite
635	S01W10						Unknown	10.97	7.94	3.33	492.78	Sharp	25	Y	quartzite
675	S01W10	D-E	20-40	33	S 1.67	W 29.00	post-Locarno Beach	8.74	9.01	3.20	317.21	Blunted	56	Y	quartzite

Artifact #	Cut	Unit	Level	Depth (cm)	N/S of 0	E/W of 0	AU	Length (cm)	Width (cm)	Thickness (cm)	Weight (g)	Edge Damage	Edge Angle (°)	Resharp?	Material
831	S01W10	A	40-60	41	S 0.90	W 29.45	Locarno Beach	6.82	6.62	4.72	340.06	Sharp	86	N	quartzite
847	S01W10	H	40-60	57	S 2.10	W 28.15	Locarno Beach	14.49	10.52	2.31	406.65	Blunted	64	Y	quartzite
1017	S01W10	F	80-100	93	S 1.60	W 27.25	Locarno Beach	9.37	4.58	5.12	351.35	Battered	81	Y	quartzite
1026	S01W10	A	80-100	97	S 0.97	W 28.30	Locarno Beach	7.82	6.88	2.78	228.25	Sharp	79	Y	quartzite
276	S02E01	H	60-80	70	S 5.85	E 2.60	post-Locarno Beach	7.17	8.07	7.15	554.03	Blunted	81	Y	quartzite
282	S02E01	H	60-80	70	S 6.00	E 1.10	post-Locarno Beach	9.62	12.75	3.25	556.57	Blunted	82	Y	quartzite
428	S02E01	B	60-80	67	S 3.10	E 1.40	post-Locarno Beach	9.92	9.27	6.16	844.48	Battered	65	Y	quartzite
516	S02E01	H	80-100	86	S 5.20	E 1.25	Locarno Beach	8.76	6.86	4.56	389.01	Sharp	49	Y	quartzite
521	S02E01	E	80-100	85	S 4.60	E 1.02	Locarno Beach	7.09	9.97	2.84	307.42	Sharp	42	Y	fgv
973	S02W04						Unknown	7.79	9.28	4.07	476.83	Battered	73	Y	fgv
1152	S02W04						Unknown	6.81	9.79	3.87	466.56	Battered	72	Y	fgv
581	S02W06	B	40-60	51	S 3.68	W 16.94	Unknown	9.75	6.39	4.59	311.86	Battered	29	N	fgv
4113	S02W07						Unknown	11.08	7.61	3.97	513.22	Sharp	63	N	quartzite
613	S02W10	I	20-40	35	S 5.80	W 27.20	post-Locarno Beach	8.63	8.46	2.95	443.47	Battered	50	Y	quartzite
615	S02W10	D	20-40	32	S 4.60	W 29.64	post-Locarno Beach	5.90	10.37	2.77	220.28	Battered	24	Y	fgv
853	S02W10	F	60-80	63	S 4.84	W 27.40	post-Locarno Beach	13.86	10.58	3.74	712.74	Blunted	84	Y	quartzite
856	S02W10	C	60-80	66	S 3.50	W 27.93	Locarno Beach	8.15	8.06	2.93	324.36	N/A	40	Y	fgv
281	S03E01	B	60-80	71	S 6.68	E 1.49	Locarno Beach	7.80	6.69	3.43	282.62	Battered	29	N	quartzite
353	S03E01	B	60-80	75	S 6.84	E 1.53	Locarno Beach	10.90	7.58	4.54	633.56	Sharp	82	Y	fgv
417	S03E01	I	80-100	85	S 11.13	E 2.15	Locarno Beach	8.68	9.08	4.37	593.61	Battered	82	Y	fgv
446	S03E01	E	60-80	77	S 7.02	E 1.27	Locarno Beach	8.78	5.63	7.12	459.18	Blunted	89	Y	fgv
456	S03E01	H	80-100	85	S 9.00	E 1.79	Locarno Beach	7.04	8.44	5.87	493.43	Battered	65	Y	quartzite
458	S03E01	F	60-80	77	S 7.50	E 2.28	Locarno Beach	9.39	12.21	2.97	429.79	Battered	77	Y	quartzite
468	S03E01	H	80-100	87	S 9.00	E 1.94	Locarno Beach	7.42	10.04	4.34	459.08	Battered	87	Y	quartzite
469	S03E01	G	80-100	85	S 8.42	E 0.97	Locarno Beach	6.88	8.69	5.02	399.76	Battered	82	Y	quartzite
473	S03E01	C	80-100	83	S 8.34	E 2.40	Locarno Beach	11.93	14.01	5.86	1213.40	N/A	39	Y	quartzite
500	S03E01	E	80-100	92	S 7.90	E 1.78	Locarno Beach	3.75	11.91	4.87	322.54	Sharp	83	Y	quartzite
509	S03E01	G	80-100	89	S 9.00	E 0.95	Locarno Beach	8.80	11.50	7.28	871.80	Blunted	45	Y	fgv
538	S03E01		100-120	102			Locarno Beach	8.44	11.87	4.11	499.34	Sharp	81	Y	quartzite
895	S03W04	A	20-40	34.5	S 6.65	W 11.39	post-Locarno Beach	7.65	9.06	5.42	547.49	Battered	44	Y	quartzite
1130	S03W04						Unknown	11.61	5.64	4.32	383.84	Battered	69	Y	fgv
933	S03W06		25-40				post-Locarno Beach	7.26	9.63	4.21	376.81	Blunted	76	Y	quartzite
404	S03W07	D	20-40	27	S 7.00-8.00	W 20.00-21.00	Unknown	7.62	13.07	4.76	654.84	Battered	90	Y	quartzite
411	S03W07	B	20-40	26	S 7.65	W 20.10	Unknown	6.11	11.39	6.85	786.70	Sharp	70	Y	quartzite
540	S03W07	C	40-60	40	S 6.00-7.00	W 18.00-19.00	Unknown	11.29	7.31	4.62	677.56	Sharp	69	N	quartzite
571	S03W07	G	60-80	77	S 8.25	W 20.60	post-Locarno Beach	8.27	11.58	5.90	740.92	Blunted	73	Y	fgv
580	S03W07	H	60-80	78	S 8.00	W 19.15	post-Locarno Beach	7.55	12.33	7.24	935.44	Battered	75	Y	fgv
4109	S03W08						Unknown	8.70	16.03	7.44	1477.00	Sharp	74	Y	quartzite
101	S04E01	C	40-60	45	S 9.49	E 2.00	Locarno Beach	5.59	9.95	4.95	323.37	Battered	56	Y	quartzite
223	S04E01	I	60-80	60	S 11.84	E 2.06	Locarno Beach	9.63	8.84	3.98	434.48	Sharp	56	Y	quartzite
315	S04E01	C	60-80	75	S 9.35	E 2.21	Locarno Beach	10.51	10.32	5.52	942.06	Battered	61	Y	quartzite
316	S04E01						Unknown	7.52	10.67	7.18	785.65	Battered	65	Y	quartzite
372	S04E01	G	60-80	77	S 11.46	E 0.75	Locarno Beach	7.48	8.03	4.74	328.53	Sharp	32	Y	quartzite
373	S04E01	E	60-80	80	S 10.52	E 1.45	Locarno Beach	9.15	9.51	6.32	768.14	Sharp	42	N	quartzite

Artifact #	Cut	Unit	Level	Depth (cm)	N/S of 0	E/W of 0	AU	Length (cm)	Width (cm)	Thickness (cm)	Weight (g)	Edge Damage	Edge Angle (°)	Resharp?	Material
375	S04E01	C	80-100	85	S 9.33	E 2.15	Locarno Beach	8.07	10.96	5.62	622.51	Sharp	76	Y	quartzite
377	S04E01						Unknown	11.09	7.10	4.63	464.40	Sharp	48	Y	fgv
378	S04E01						Unknown	13.08	15.21	7.81	1439.20	Sharp	49	Y	quartzite
386	S04E01	E	80-100	83	S 10.00-11.00	E 1.00-2.00	Locarno Beach	8.46	9.60	5.11	565.27	Sharp	71	Y	quartzite
400	S04E01	E	80-100	83	S 10.27	E 1.10	Locarno Beach	9.49	9.09	4.71	585.72	Sharp	49	Y	fgv
401	S04E01	E	80-100	83	S 10.27	E 1.18	Locarno Beach	7.91	9.91	4.03	417.47	Blunted	57	Y	quartzite
402	S04E01	H	80-100	86	S 11.48	E 1.26	Locarno Beach	10.72	9.19	4.57	680.21	Battered	57	Y	quartzite
407	S04E01	H	80-100	83	S 11.08	E 1.90	Locarno Beach	8.62	6.10	5.12	366.45	Battered	68	Y	quartzite
408	S04E01	E	80-100	86	S 10.88	E 1.55	Locarno Beach	7.79	8.55	3.77	309.93	Sharp	83	Y	quartzite
410	S04E01	D	80-100	83	S 10.31	E 0.76	Locarno Beach	8.63	8.18	3.61	368.56	Sharp	74	Y	quartzite
424	S04E01	H	80-100	85	S 11.50	E 1.70	Locarno Beach	6.83	6.92	4.49	332.18	Battered	60	N	quartzite
425	S04E01	H	80-100	85	S 11.46	E 1.63	Locarno Beach	7.90	8.54	3.50	330.81	Battered	74	Y	quartzite
429	S04E01	B	80-100	83	S 9.80	E 1.22	Locarno Beach	10.29	8.42	5.24	536.35	Battered	67	Y	fgv
430	S04E01	A	80-100	84	S 9.80	E 0.77	Locarno Beach	7.92	7.80	5.52	503.79	Sharp	44	Y	quartzite
433	S04E01	F	80-100	85	S 10.02	E 2.35	Locarno Beach	8.99	8.47	4.54	438.14	Blunted	82	Y	quartzite
435	S04E01	E	80-100	85	S 10.13	E 1.95	Locarno Beach	10.43	11.11	5.52	1161.94	Battered	74	Y	quartzite
436	S04E01	B	80-100	84	S 10.44	E 1.05	Locarno Beach	7.67	7.79	4.31	394.11	Battered	72	Y	quartzite
441	S04E01	G	80-100	86	S 11.40	E 0.60	Locarno Beach	7.92	9.64	5.20	566.04	Blunted	76	Y	quartzite
442	S04E01	B	80-100	84	S 9.71	E 1.98	Locarno Beach	7.24	9.76	5.17	660.68	Sharp	56	Y	quartzite
443	S04E01	F	80-100	98	S 10.34	E 2.08	Locarno Beach	7.93	5.73	5.29	493.52	Battered	39	Y	quartzite
444	S04E01						Unknown	7.76	10.23	3.98	455.45	Battered	74	Y	quartzite
447	S04E01	D	80-100	90	S 10.88	E 0.88	Locarno Beach	11.07	10.55	4.13	732.77	Blunted	81	Y	quartzite
449	S04E01	F	80-100	84	S 10.83	E 2.18	Locarno Beach	11.67	7.92	6.88	914.77	Battered	44	Y	quartzite
460	S04E01	A	80-100	81	S 9.17	E 0.92	Locarno Beach	9.31	11.78	5.22	793.05	Battered	70	N	quartzite
461	S04E01	B	80-100	83	S 9.08	E 1.90	Locarno Beach	9.68	10.35	3.44	586.42	Blunted	72	Y	quartzite
462	S04E01	C	80-100	82	S 9.06	E 2.23	Locarno Beach	9.87	8.71	5.81	648.79	Sharp	45	Y	quartzite
463	S04E01	B/E	80-100	87	S 10.00	E 1.26	Locarno Beach	9.43	9.65	4.41	688.92	Sharp	79	Y	fgv
464	S04E01	D	80-100	89	S 10.66	E 0.90	Locarno Beach	13.95	13.86	5.84	1903.80	Battered	78	Y	quartzite
465	S04E01	E	80-100	90	S 10.96	E 1.65	Locarno Beach	4.46	8.24	5.96	322.34	Battered	68	Y	quartzite
466	S04E01	A	80-100	83	S 9.13	E 0.79	Locarno Beach	9.87	6.60	5.02	465.69	Battered	82	Y	quartzite
477	S04E01	G	80-100	87	S 9.63	E 0.64	Locarno Beach	9.38	12.14	4.24	829.77	Battered	74	Y	quartzite
478	S04E01	G	80-100	89	S 10.25	E 1.43	Locarno Beach	9.53	11.27	1.81	336.74	Battered	40	Y	quartzite
479	S04E01	G	80-100	85	S 11.12	E 1.90	Locarno Beach	6.66	4.80	1.84	83.91	Blunted	88	Y	quartzite
481	S04E01	G	80-100	87	S 11.51	E 1.80	Locarno Beach	12.23	11.12	4.89	847.66	Battered	86	Y	fgv
482	S04E01	G	80-100	83	S 11.63	E 2.17	Locarno Beach	9.41	8.80	5.47	605.29	Sharp	82	Y	fgv
483	S04E01	G	80-100	88	S 11.82	E 2.07	Locarno Beach	8.86	13.27	6.29	1021.26	Battered	67	Y	fgv
484	S04E01	G	80-100	88	S 11.31	E 1.72	Locarno Beach	8.09	12.96	4.41	968.61	Battered	46	Y	quartzite
485	S04E01	G	80-100	87	S 11.06	E 1.78	Locarno Beach	8.76	8.06	4.96	590.43	Blunted	56	Y	quartzite
486	S04E01	G	80-100	87	S 11.08	E 2.38	Locarno Beach	6.41	8.60	4.38	377.21	Sharp	90	Y	quartzite
487	S04E01	G	80-100	84	S 11.78	E 1.69	Locarno Beach	7.81	8.85	4.59	468.97	Battered	34	Y	fgv
488	S04E01	G	80-100	83	S 11.78	E 1.46	Locarno Beach	8.75	10.26	4.98	629.14	Sharp	70	Y	quartzite
489	S04E01	G	80-100	91	S 10.65	E 1.31	Locarno Beach	5.98	7.91	3.97	339.28	Battered	82	Y	quartzite
504	S04E01	G	80-100	96	S 11.20	E 0.68	Locarno Beach	10.71	11.80	5.55	1117.53	Sharp	78	Y	quartzite
505	S04E01	D	80-100	92	S 10.76	E 0.96	Locarno Beach	8.50	7.81	3.98	376.06	Battered	65	Y	quartzite

Artifact #	Cut	Unit	Level	Depth (cm)	N/S of 0	E/W of 0	AU	Length (cm)	Width (cm)	Thickness (cm)	Weight (g)	Edge Damage	Edge Angle (°)	Resharp?	Material
513	S04E01						Unknown	8.18	11.82	6.89	812.96	Blunted	74	Y	quartzite
515	S04E01	C	80-100	88	S 10.08	E 2.10	Locarno Beach	7.77	8.56	4.81	447.21	Sharp	58	Y	fgv
519	S04E01	F	80-100	92	S 10.90	E 2.50	Locarno Beach	8.37	8.51	4.13	295.09	Sharp	76	Y	fgv
739	S04W04	E	40-60	37	S 10.53	W 10.80	post-Locarno Beach	9.08	7.49	3.54	344.31	Blunted	71	Y	quartzite
830	S04W04	C	40-60	55	S 9.75	W 9.84	post-Locarno Beach	10.07	11.08	2.92	501.94	Sharp	73	Y	quartzite
835	S04W04	B	40-60	57	S 9.25	W 10.37	post-Locarno Beach	8.64	8.79	3.63	329.75	Sharp	54	Y	fgv
871	S04W04						Unknown	7.12	10.30	2.55	262.64	Blunted	83	Y	quartzite
883	S04W04						Unknown	5.89	7.29	7.47	479.86	Battered	51	Y	quartzite
896	S04W04						Unknown	6.87	7.96	4.11	396.58	Battered	74	Y	quartzite
908	S04W04	E	60-80	76	S 10.55	W 10.18	Locarno Beach	9.95	6.92	5.66	600.69	Battered	36	Y	quartzite
913	S04W04						Unknown	11.68	12.42	5.38	1173.19	Blunted	75	Y	quartzite
921	S04W04	I	80-100	82	S 11.5	W 9.12	Locarno Beach	7.92	9.00	3.88	358.22	Sharp	76	Y	quartzite
938	S04W04						Unknown	6.44	11.99	6.27	716.89	Sharp	46	Y	fgv
945	S04W04						Unknown	7.61	14.99	6.33	1107.26	Battered	45	Y	fgv
949	S04W04						Unknown	8.31	6.68	3.32	244.77	Sharp	61	Y	quartzite
951	S04W04						Unknown	9.26	9.97	4.23	566.77	Battered	38	Y	serpentine
954	S04W04	C	80-100	92	S 9.59	W 9.96	Locarno Beach	9.66	7.91	2.83	372.14	Blunted	82	Y	fgv
957	S04W04						Unknown	10.26	9.15	5.02	616.52	Battered	48	Y	fgv
958	S04W04						Unknown	8.37	8.61	5.72	609.35	Battered	73	Y	quartzite
963	S04W04	E	80-100	98	S 10.86	W10.58	Locarno Beach	7.56	10.10	5.98	737.48	Battered	45	Y	quartzite
971	S04W04	D	100-120	100-105	S 10.00-11.00	W 11.00-12.00	Locarno Beach	5.22	8.36	3.35	258.58	Sharp	32	Y	fgv
980	S04W04	F	100-120	102	S 10.66	W 9.89	Locarno Beach	6.27	9.20	5.69	451.74	Battered	76	Y	quartzite
981	S04W04	D	100-120	100	S 10.59	W 11.65	Locarno Beach	9.74	7.26	4.91	350.26	Sharp	72	Y	quartzite
991	S04W04	D	100-120	114	S 10.77	W 11.74	Locarno Beach	12.55	8.04	6.31	686.76	Sharp	50	Y	fgv
995	S04W04	E	100-120	107	S 10.33	W 10.81	Locarno Beach	7.62	7.26	5.77	390.46	Battered	76	Y	quartzite
1002	S04W04	B	100-120	110	S 9.80	W 10.94	Locarno Beach	7.15	8.48	3.03	234.41	Sharp	62	Y	fgv
1013	S04W04	E	100-120	116	S 9.95	W 9.68	Locarno Beach	10.24	11.75	5.24	968.30	Blunted	57	Y	fgv
1018	S04W04	G	100-120	103	S 11.27	W 11.14	Locarno Beach	6.71	10.42	4.18	381.63	Battered	68	Y	quartzite
1044	S04W04	D/E	100-120	110-120	S 10.00-11.00	W 10.00-12.00	Locarno Beach	7.82	9.55	3.67	369.50	Blunted	73	Y	fgv
1137	S04W04	F	80-100	83	S 10.49	W 9.50-10.4	Locarno Beach	8.14	10.25	4.40	459.13	Battered	66	Y	quartzite
99	S05E01	H	80-100	95	S 14.45	E 1.56	Locarno Beach	8.08	14.60	5.46	1102.70	Battered	63	Y	quartzite
100	S05E01	D	80-100	90	S 13.67	E 0.67	Locarno Beach	5.12	7.31	5.94	289.61	Sharp	48	Y	quartzite
103	S05E01		80-100	100			Locarno Beach	5.88	7.98	2.48	152.87	Sharp	33	Y	fgv
1247	S05E05	F	SURFACE		S 13.30	E 14.10	Unknown	7.53	9.95	5.06	523.30	Sharp	46	Y	quartzite
475	S05E06	D	40-60	56	S 13.00-14.00	E 15.00-16.00	Unknown	9.75	10.59	5.33	709.53	N/A	40	Y	quartzite
522	S05E06	D	40-60	52	S 13.94	E 15.98	Unknown	7.70	7.61	4.09	379.22	Sharp	66	Y	quartzite
552	S05E06	H	60-80	79	S 14.05	E 16.23	Unknown	8.11	11.83	6.29	895.87	Sharp	81	Y	quartzite
553	S05E06	E	60-80	78	S 13.75	E 16.68	Unknown	11.42	9.79	7.54	1336.10	Sharp	48	Y	quartzite
562	S05E06	E	80-100	84	S 16.55	E 13.36	Unknown	7.38	6.13	3.42	225.11	Sharp	71	Y	quartzite
563	S05E06	E	60-80	79	S 16.27	E 13.26	Unknown	8.62	7.61	2.49	237.13	Sharp	88	Y	quartzite
566	S05E06	E	80-100	83	S 13.00-14.00	E 16.00-17.00	Unknown	9.62	8.55	4.16	356.79	Sharp	53	Y	quartzite
574	S05E06	E	80-100	85	S 13.65	E 17.20	Unknown	6.87	10.17	5.44	538.11	Battered	61	N	quartzite
576	S05E06	E	80-100	85	S 13.28	E 16.00	Unknown	6.66	8.71	4.26	295.82	Sharp	78	Y	quartzite
577	S05E06						Unknown	9.05	8.41	5.47	510.38	Blunted	64	N	quartzite

Artifact #	Cut	Unit	Level	Depth (cm)	N/S of 0	E/W of 0	AU	Length (cm)	Width (cm)	Thickness (cm)	Weight (g)	Edge Damage	Edge Angle (°)	Resharp?	Material
591	S05E06						Unknown	8.36	10.39	7.50	857.34	Battered	62	Y	quartzite
605	S05E06	B	80-100	90	S 12.70	E 16.55	Unknown	7.69	9.61	6.12	798.19	Battered	79	Y	fgv
1160	S06E04	D	SURFACE		S 16.75	E 9.76	Unknown	8.44	9.31	4.45	529.93	Blunted	75	N	quartzite
1266	S06E04	C	20-40		S 15.00-16.00	E 11.00-12.00	Unknown	8.39	13.53	4.09	590.17	N/A	34	Y	quartzite
1308	S06E04	F	40-60	45	S 16.20	E 11.90	Unknown	10.52	9.70	4.32	608.75	Sharp	56	Y	quartzite
1320	S06E04	H	40-60	38	S 17.90	E 10.90	Unknown	14.54	9.05	4.45	698.23	Sharp	90	Y	quartzite
1376	S06E04						Unknown	6.56	7.36	4.14	279.81	Sharp	46	Y	quartzite
1394	S06E04						Unknown	8.66	8.22	5.59	411.02	Sharp	72	Y	quartzite
1404	S06E04	E	60-80	78	S 16.24	E 10.63	Unknown	7.45	6.06	4.16	229.75	Battered	49	Y	quartzite
1407	S06E04	H	60-80	78	S 17.04	E 10.85	Unknown	7.70	10.36	4.74	497.72	Sharp	75	Y	quartzite
1408	S06E04						Unknown	8.63	7.38	3.99	378.76	Battered	29	N	fgv
1410	S06E04	H	60-80	80	S 17.60	E 10.15	Unknown	10.47	8.77	4.41	649.62	Blunted	67	N	fgv
1414	S06E04	F	60-80	80	S 16.85	E 9.77	Unknown	9.91	7.55	3.69	536.41	Battered	76	Y	quartzite
1415	S06E04	D	60-80	80	S 16.60	E 9.68	Unknown	8.82	9.50	4.08	492.28	Battered	80	Y	quartzite
1417	S06E04	I	80-100	88	S 17.50	E 11.00	Unknown	12.79	10.49	5.61	925.14	Blunted	67	Y	quartzite
1424	S06E04	D	80-100	80-85	S 16.00-17.00	E 9.00-10.00	Unknown	8.35	12.37	5.52	833.13	Sharp	57	Y	quartzite
1425	S06E04	A	80-100	92	S 15.95	E 9.47	Unknown	9.37	7.98	5.56	522.64	Sharp	30	N	quartzite
1426	S06E04	A	80-100	89	S 15.86	E 9.34	Unknown	8.66	6.37	3.64	315.90	Battered	73	Y	quartzite
1435.1	S06E04						Unknown	9.82	9.10	5.56	747.17	Battered	47	N	quartzite
1435.2	S06E04						Unknown	6.60	9.12	6.06	502.97	Sharp	57	Y	quartzite
1437	S06E04	E	80-100	82-83	S 16.35	E 10.55	Unknown	13.27	8.37	5.29	830.19	Sharp	58	Y	quartzite
1448	S06E04	B	80-100	94	S 15.55	E 10.66	Unknown	7.54	8.40	3.72	349.57	Sharp	35	Y	quartzite
1459	S06E04						Unknown	7.41	7.00	4.49	266.58	Battered	68	Y	quartzite
1583	S06E04	F	100-120	105	S 16.28	E 11.80	Unknown	8.25	8.08	4.59	419.41	Battered	69	Y	quartzite
1584	S06E04	D	100-120	103	S 16.12	E 9.32	Unknown	7.93	6.58	4.44	343.91	Sharp	62	Y	quartzite
1636	S06E04	H	60-80	75	S 17.00-18.00	E 10.00-11.00	Unknown	8.76	9.67	3.27	477.08	Battered	73	Y	fgv
1161	S06E05	F	SURFACE		S 16.75	E 14.80	Unknown	12.28	9.69	5.29	943.60	Sharp	49	N	sandstone
745	S06E11	D	0-20	7	S 16.34	E 30.74	Unknown	10.35	8.63	7.62	809.17	Battered	87	Y	fgv
1040	S06E11	H	60-80	63	S 17.06	E 31.34	Unknown	10.10	7.63	2.94	428.49	Battered	67	Y	quartzite
1041	S06E11	H	60-80	65	S 17.00-18.00	E 31.00-32.00	Unknown	6.05	7.64	3.79	281.64	Battered	61	Y	quartzite
1635	S06E19						Unknown	7.32	7.46	4.77	397.11	Battered	59	Y	quartzite
1433	S07E08	A	80-100	94	S 18.63	E 21.90	Locarno Beach	7.05	7.34	3.54	282.23	Blunted	74	Y	quartzite
2693	S07E09		60-80				post-Locarno Beach	7.79	7.42	4.31	497.23	Battered	69	Y	granite
2694	S07E09		60-80				post-Locarno Beach	8.18	9.55	4.57	445.14	Battered	62	Y	metasediment
2802	S07E09	H	100-120	105	S 20.00-21.00	E 25.00-26.00	Locarno Beach	8.32	9.35	4.57	423.06	Battered	82	Y	quartzite
2804	S07E09	H	100-120		S 20.00-21.00	E 25.00-26.00	Locarno Beach	8.71	9.94	5.31	744.38	Battered	65	Y	quartzite
2806	S07E09	H	100-120	118	S 20.00-21.00	E 25.00-26.00	Locarno Beach	6.99	11.63	4.58	499.06	Battered	79	Y	quartzite
2823	S07E09	B	120-140	124	S 18.00-19.00	E 25.00-26.00	Locarno Beach	9.86	8.06	5.04	621.86	Battered	80	Y	quartzite
2861	S07E09	G	140-160	143	S 20.04	E 24.40	Locarno Beach	9.68	7.13	4.33	430.23	Battered	79	Y	quartzite
2892	S07E09						Unknown	8.80	9.18	4.75	507.66	Battered	71	Y	quartzite
1303	S08E08	A	80-100	80	S 21.86	E 21.62	Locarno Beach	6.32	9.21	5.23	454.87	Battered	83	Y	quartzite
1403	S08E08	A	100-120	120	S 21.06	E 21.66	Locarno Beach	6.12	10.10	5.20	448.88	Blunted	70	Y	fgv
2807	S08E09	D	120-140	128	S 9.83	E 25.02	Locarno Beach	6.67	9.39	3.96	365.89	Blunted	77	Y	quartzite
2810	S08E09	D	120-140	136	S 22.17	E 24.50	Locarno Beach	10.17	10.86	5.16	825.56	Sharp	62	Y	quartzite

Artifact #	Cut	Unit	Level	Depth (cm)	N/S of 0	E/W of 0	AU	Length (cm)	Width (cm)	Thickness (cm)	Weight (g)	Edge Damage	Edge Angle (°)	Resharp?	Material
2816	S08E09	E	120-140	136	S 22.24	E 25.50	Locarno Beach	7.49	9.56	5.27	528.66	Battered	83	Y	quartzite
2836	S08E09	D	140-160	144	S 22.11	E 24.73	Locarno Beach	7.82	9.06	4.44	470.69	Battered	76	Y	quartzite
823	S08E15	G	30-50	42	S 23.13	E 42.75	Unknown	7.23	6.88	4.73	313.38	Battered	82	Y	fgv
1276	S09E19	E	60-80	77	S 25.84	E 55.01	post-Locarno Beach	7.37	8.30	5.67	633.89	Battered	64	Y	fgv
1281	S09E19	E	60-80	78	S 25.85	E 55.88	post-Locarno Beach	8.42	7.54	6.97	534.19	Battered	67	Y	quartzite
1292	S09E19						Unknown	10.24	8.41	6.31	766.36	Battered	60	Y	quartzite
1293	S09E19	G	100-120	104	S 26.06	E 54.63	Unknown	6.22	9.27	3.47	286.20	Sharp	84	Y	fgv
1322	S09E19	B	100-120	106	S 24.80	E 55.11	Unknown	6.00	9.99	3.69	370.35	Blunted	67	Y	quartzite
1323	S09E19	C	100-120	107	S 24.00-25.00	E 56.00-57.00	Unknown	7.64	10.36	4.44	395.54	Battered	55	Y	quartzite
1326	S09E19	C	100-120	107	S 24.76	E 56.45	Unknown	8.04	11.47	6.88	766.60	Blunted	84	Y	fgv
1332	S09E19	H	100-120	112	S 26.20	E 55.37	Unknown	6.40	7.38	2.84	216.59	Sharp	74	Y	fgv
1333	S09E19	H	100-120	112	S 26.22	E 55.70	Unknown	9.35	10.17	4.23	636.46	Blunted	75	Y	fgv
1336	S09E19	C	100-120	112	S 26.45	E 54.86	Unknown	7.10	7.96	4.68	445.34	Blunted	82	Y	quartzite
1337	S09E19	D	100-120	112	S 25.24	E 55.37	Unknown	7.33	10.13	3.44	340.44	Sharp	73	Y	quartzite
1338	S09E19	D	100-120	112	S 25.2	E 54.5	Unknown	5.07	8.49	6.75	520.55	Sharp	76	Y	quartzite
1340	S09E19	E	100-120	112	S 25.05	E 55.66	Unknown	8.18	10.01	7.57	753.47	Battered	57	Y	quartzite
1344	S09E19	I	100-120	113	S 26.26	E 56.13	Unknown	8.23	12.43	4.95	690.72	Battered	86	Y	fgv
1354	S09E19	H	100-120	120	S 26.50	E 55.28	Unknown	9.04	9.17	4.29	513.19	Blunted	78	Y	fgv
2349	S10E13	D	20-40	23	S 28.05	E 36.52	Unknown	6.97	5.12	4.92	237.46	Battered	56	Y	quartzite
2401	S10E13	H	20-40	31	S 29.25	E 37.15	Unknown	13.85	11.42	6.19	1337.10	Blunted	71	Y	quartzite
2879	S10E13						Unknown	7.31	7.49	2.47	177.89	Sharp	55	Y	quartzite
2880	S10E13						Unknown	14.32	16.07	7.12	2048.20	Blunted	82	Y	quartzite
2882	S10E13						Unknown	12.06	8.69	5.73	694.63	Sharp	35	Y	quartzite
1591	S11E05	A	20-40	35	S 30.00-31.00	E 12.00-13.00	Unknown	19.00	9.72	4.28	1227.30	Sharp	74	Y	quartzite
1358	S12E19	B	20-40	22	S 33.90	E 55.20	Unknown	9.02	8.51	4.47	529.45	Battered	74	Y	quartzite
1388	S12E19	B	40-60	41	S 33.60	E 55.00	Unknown	8.43	10.19	4.79	646.76	Battered	69	Y	quartzite
1465	S12E19	A	100-120	100	S 33.66	E 54.62	Unknown	9.09	7.84	3.87	297.53	Sharp	37	N	quartzite
1582	S12E19	H	100-120	117	S 35.30	E 55.32	Unknown	9.57	8.22	5.02	438.86	Battered	57	Y	quartzite
2632	S15E15	E	40-60	44	S 43.39	E 43.60	Unknown	9.64	8.32	4.52	520.50	Blunted	63	Y	fgv
1603	S15E19	G	40-60	63	S 44.20	E 54.75	Unknown	11.56	7.67	5.54	610.25	Sharp	47	Y	quartzite
1627	S15E19	E	80-100	96	S 43.90	E 55.30	Unknown	9.51	7.45	5.39	497.41	Battered	56	Y	quartzite
2304	S16E17	B	20-40	37	S 45.78	E 49.24	Unknown	9.74	8.10	3.72	416.97	Blunted	80	Y	granite
2428	S16E17	F	40-60	56	S 46.79	E 50.12	Locarno Beach	7.72	12.42	5.04	718.75	Battered	63	Y	quartzite
2297	S16E18		20-40				Unknown	10.81	10.39	5.21	689.71	Battered	44	Y	quartzite
3082	S20E29						Unknown	10.09	6.58	4.35	396.89	Sharp	29	Y	quartzite
3179	S20E29	E	80-100	90	S 58.15	E 85.19	post-Locarno Beach	8.98	9.90	6.55	671.14	Battered	85	Y	quartzite
3195	S20E29	H	80-100	100	S 58.95	E 86.23	post-Locarno Beach	7.75	6.58	3.63	357.46	Battered	60	Y	quartzite
2678	S21E24		60-80				Unknown	11.13	11.03	5.08	680.58	Sharp	87	Y	quartzite
2812	S21E24						Unknown	10.98	10.79	4.66	702.76	Sharp	64	Y	fgv
2818	S21E24	I	120-140	140	S 62.00-63.00	E 71.00-72.00	Unknown	7.16	7.93	3.61	269.54	Sharp	47	Y	quartzite
2819	S21E24	I	140-160	155	S 62.00-63.00	E 71.00-72.00	Unknown	9.14	12.49	4.75	742.20	Battered	47	Y	quartzite
2824	S21E24	B	160-180		S 60.00-61.00	E 70.00-71.00	Unknown	8.24	5.48	2.68	150.14	Sharp	41	N	quartzite
2829	S21E24	F	160-180	175	S 61.00-62.00	E 71.00-72.00	Unknown	6.19	5.94	4.16	203.39	Blunted	86	Y	quartzite
2831	S21E24	F	160-180	175	S 61.00-62.00	E 71.00-72.00	Unknown	5.39	7.31	3.27	209.91	Battered	74	Y	quartzite

Artifact #	Cut	Unit	Level	Depth (cm)	N/S of 0	E/W of 0	AU	Length (cm)	Width (cm)	Thickness (cm)	Weight (g)	Edge Damage	Edge Angle (°)	Resharp?	Material
2833	S21E24	F	160-180		S 60.93	E 70.17	Unknown	7.33	11.72	4.19	430.60	Sharp	38	N	quartzite
2841	S21E24	B	160-180	170	S 60.00-61.00	E 70.00-71.00	Unknown	6.61	6.74	5.42	254.04	Sharp	45	N	metasediment
2843	S21E24	B	160-180	165	S 60.00-61.00	E 70.00-71.00	Unknown	7.12	9.63	4.94	437.72	Sharp	44	Y	fgv
2845	S21E24	B	180-200	190	S 60.00-61.00	E 70.00-71.00	Unknown	11.91	9.49	4.87	804.38	Sharp	60	Y	quartzite
2883	S21E24						Unknown	12.54	7.94	5.12	647.82	Battered	70	Y	quartzite
2891	S21E24	C	160-180	180	S 60.00-61.00	E 71.00-72.00	Unknown	7.56	7.69	4.13	358.19	Sharp	20	N	quartzite
3032	S21E29						Unknown	5.07	7.92	2.32	121.51	Sharp	73	Y	quartzite
3036	S21E29	H	20-40	31	S 62.10	E 85.10	post-Locarno Beach	9.84	8.73	4.41	584.98	Blunted	47	N	fgv
3149	S21E29						Unknown	7.36	10.06	5.10	541.02	Battered	67	Y	fgv
3158	S21E29	C	60-80	68	S 60.51	E 86.16	post-Locarno Beach	5.69	8.81	5.21	340.21	Blunted	61	Y	quartzite
3230	S21E29						Unknown	7.60	6.19	3.45	240.88	Sharp	47	Y	fgv
3238	S21E29	E	80-100	85	S 61.80	E 85.24	post-Locarno Beach	8.03	8.93	5.51	591.92	Sharp	86	Y	quartzite
3268	S21E29	E	120-140	127	S 61.38	E 85.83	Locarno Beach	5.93	9.41	3.66	313.39	Sharp	82	Y	quartzite
3275	S21E29	B	80-100	97	S 60.96	E 85.07	post-Locarno Beach	11.18	12.23	5.42	864.17	Sharp	72	Y	quartzite
3278	S21E29	A	80-100	100	S 60.90	E 85.00	post-Locarno Beach	8.45	9.75	4.46	638.69	Sharp	79	Y	quartzite
3279	S21E29	D	80-100	98	S 61.05	E 84.98	post-Locarno Beach	12.57	10.09	7.45	860.76	Sharp	50	Y	quartzite
3287	S21E29	G	100-120	119	S 62.25	E 85.00	Locarno Beach	9.58	7.47	3.94	253.96	Blunted	63	Y	quartzite
3291	S21E29	H	100-120	105	S 62.15	E 85.53	Locarno Beach	9.87	8.81	4.11	524.37	Battered	54	N	quartzite
3296	S21E29	E	100-120	102	S 61.80	E 85.5	Locarno Beach	11.84	5.95	5.40	513.06	Blunted	75	Y	quartzite
3298	S21E29	E	100-120	111	S 61.50	E 85.50	Locarno Beach	7.63	6.13	2.98	188.17	Sharp	49	Y	quartzite
2384	S22E27	F	80-100	84	S 64.14	E 79.80	Unknown	5.29	5.95	4.13	242.73	Battered	61	Y	quartzite
2495	S22E27	C	120-140	130	S 63.78	E 80.04	Unknown	7.43	9.63	5.24	572.70	Sharp	72	Y	quartzite
2537	S22E27	G	140-160		S 65.00-66.00	E 78.00-79.00	Unknown	12.34	9.81	4.66	785.64	Battered	64	Y	quartzite
3079	S22E29	E	60-80	68	S 64.01	E 84.34	post-Locarno Beach	9.80	6.58	4.03	332.63	Battered	56	N	quartzite
3102	S22E29	E	60-80	66	S 64.90	E 85.90	post-Locarno Beach	5.55	6.49	2.28	108.05	Sharp	74	Y	fgv
2554	S23E27	I	140-160	150	S 68.20	E 79.80	Unknown	8.61	8.62	3.08	245.33	Sharp	67	Y	quartzite
2643	S23E27	B	100-120	118	S 66.50	E 79.60	Unknown	7.13	7.72	3.20	234.97	Sharp	67	Y	quartzite
3271	S23E29	E	80-100	89	S 67.97	E 85.70	post-Locarno Beach	8.97	12.28	5.28	851.02	Blunted	38	Y	quartzite
37	Spoil pile						Unknown	12.12	12.89	5.41	1183.14	Blunted	66	Y	quartzite